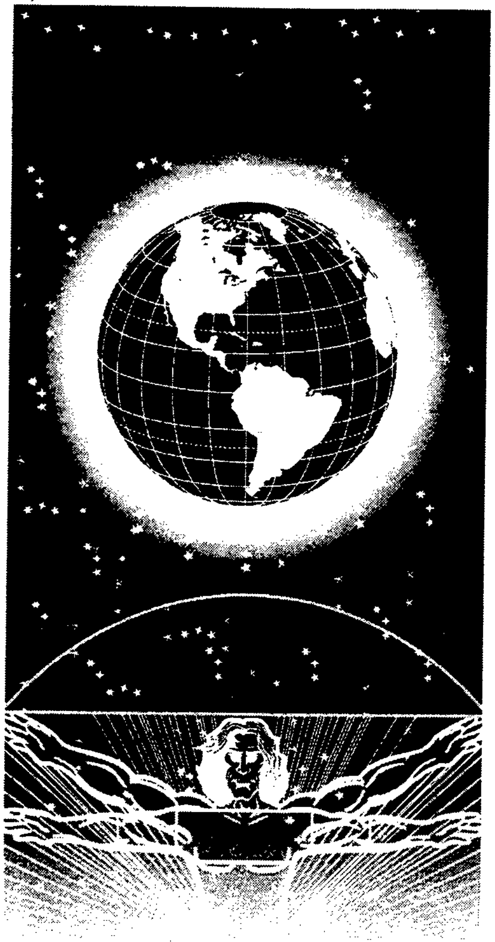
IERA-RS-BR-SR-2001-0003



# UNITED STATES AIR FORCE
# IERA

# Medical Waste Incinerator Emissions Test Malcolm Grow Medical Center, Building 1056, Andrews Air Force Base, Maryland

**Pacific Environmental Services, Inc.**
**560 Herndon Parkway, Suite 200**
**Herndon, VA 20170-5240**

**April 2001**

20010921 086

**Air Force Institute for Environment, Safety and Occupational Health Risk Analysis**
**Risk Analysis Directorate**
**Environmental Analysis Division**
**2513 Kennedy Circle**
**Brooks Air Force Base TX 78235-5123**

## NOTICES

When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely Government-related procurement, the United States Government incurs no responsibility or any obligation whatsoever. The fact that the Government may have formulated or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication, or otherwise in any manner construed, as licensing the holder or any other person or corporation; or as conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

The mention of trade names or commercial products in this publication is for illustration purposes and does not constitute endorsement or recommendation for use by the United State Air Force.

The Office of Public Affairs has reviewed this report, and it is releasable to the National Technical Information Service, where it will be available to the general public, including foreign nationals.

This report has been reviewed and is approved for publication.

Government agencies and their contractors registered with Defense Technical Information Center (DTIC) should direct requests for copies to: Defense Technical Information Center, 8725 John J. Kingman Rd., STE 0944, Ft. Belvoir, VA 22060-6218.

Non-Government agencies may purchase copies of this report from: National Technical Information Services (NTIS), 5285 Port Royal Road, Springfield, VA 22161-2103.

S. Jeanette Howard

S. JEANETTE HOWARD, Maj, USAF, BSC, CIH
Chief, Air Quality Branch

Craig B. Dezell

CRAIG B. DEZELL, Maj, USAF, BSC
Chief, Environmental Analysis Division

| REPORT DOCUMENTATION PAGE | | | *Form Approved* *OMB No. 0704-0188* |
|---|---|---|---|

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

| | | |
|---|---|---|
| **1. AGENCY USE ONLY** *(Leave blank)* | **2. REPORT DATE** 6 April 2001 | **3. REPORT TYPE AND DATES COVERED** Special Report |

**4. TITLE AND SUBTITLE**
Medical Waste Incinerator Emissions Test
Malcolm Grow Medical Center, Building 1056
Andrews AFB, Maryland

**5. FUNDING NUMBERS**
F41624-95-D-9017

**6. AUTHOR(S)**

**7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)**
Pacific Environmental Services, Inc.
560 Herndon Parkway, Suite 200
Herndon, VA 20170-5240

**8. PERFORMING ORGANIZATION REPORT NUMBER**

**9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)**
AFIERA/RSEQ, 2513 Kennedy Circle, Brooks AFB, TX 78235-5123

89 CES/CEVQ, 3479 Fetchet Avenue, Andrews AFB, MD 20762-4803

**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**
IERA-RS-BR-SR-2001-0003

**11. SUPPLEMENTARY NOTES**

**12a. DISTRIBUTION AVAILABILITY STATEMENT**
Approved for public release; distribution is unlimited.

**12b. DISTRIBUTION CODE**

**13. ABSTRACT** *(Maximum 200 words)*

The Malcolm Grow Medical Center operates a medical waste incinerator at Andrews AFB under Maryland Department of the Environment Operating Permit No. 16-00655. This report presents the results of the initial performance testing as required by the operating permit.

**14. SUBJECT TERMS**
medical waste incinerator, management plan, COMAR, toxic pollutant, emissions, mercury, cadmium, lead, hydrogen, chloride, infectious, hospital, opacity, pathological

**15. NUMBER OF PAGES**
388

**16. PRICE CODE**

| 17. SECURITY CLASSIFICATION OF REPORT | 18. SECURITY CLASSIFICATION OF THIS PAGE | 19. SECURITY CLASSIFICATION OF ABSTRACT | 20. LIMITATION OF ABSTRACT |
|---|---|---|---|
| Unclassified | Unclassified | Unclassified | UL |

Standard Form 298 (Rev. 2-89) (EG)
Prescribed by ANSI Std. 239.18
Designed using Perform Pro, WHS/DIOR, Oct 94

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

## LIST OF TABLES



## LIST OF FIGURES

## ACRONYM AND ABBREVIATION LIST

| | |
|---|---|
| AFB | Air Force Base |
| AFIERA | Air Force Institute for Environmental Safety and Occupational Health Risk Analysis |
| Alta | Alta Analytical Perspectives |
| ASTM | American Society of Testing Materials |
| BSM | Base Surveillance Monitor |
| Cd | cadmium |
| CEMs | continuous emission monitors |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| COMAR | Code of Maryland Air Regulations |
| °F | degrees Fahrenheit |
| EPA | United States Environmental Protection Agency |
| FAL | First Analytical Laboratories |
| GC/MS | gas chromatography/mass spectrometry |
| GFC | Gas Filter Correlation |
| HCl | hydrogen chloride |
| Hg | mercury |
| ID | inner diameter |
| lb/hr | pounds per hour |
| MDE | Maryland Department of the Environment |
| MWI | medical waste incinerator |
| N2 | nitrogen |
| NO | nitrogen oxide |
| $NO_x$ | oxides of nitrogen |
| $O_2$ | oxygen |
| OSHA | Occupational Safety and Health Administration |
| % | percent |
| Pb | lead |
| PCDD/PCDF | dioxins/dibenzofurans |
| PES | Pacific Environmental Services, Inc. |
| PM | particulate matter |
| ppmv | parts per million by volume |
| QA/QC | quality assurance/quality control |
| $SO_2$ | sulfur dioxide |
| TPM | Technical Project Manager |

THIS PAGE INTENTIONALLY LEFT BLANK

# 1.0 INTRODUCTION

The Malcolm Grow Medical Center operates a medical waste incinerator (MWI) at Andrews Air Force Base (AFB), Maryland. The MWI is permitted to burn Type O and infectious/pathological wastes and has a design (rated) capacity of 385 pounds per hour (lb/hr) for this type waste.

The MWI is operated under authority of Maryland Department of the Environment (MDE) Operating Permit No. 16-00655. The MWI is subject to the new MDE standards for medium size incinerators, **"Requirements for the Control of Emissions from Hospital Medical Infectious Waste Incinerators,"** Code of Maryland Air Regulations (COMAR) 26.11.08. These standards are derived from emission guidelines and compliance schedules published by the United States Environmental Protection Agency (EPA) on 15 September 1997 and implement sections 111(d) and 129 of the Clean Air Act and established emission limits for particulate matter (PM), carbon monoxide (CO), dioxins/dibenzofurans (PCDD/PCDF), hydrogen chloride (HCl), sulfur dioxide ($SO_2$), oxides of nitrogen ($NO_x$), lead (Pb), cadmium (Cd), and mercury (Hg). Initial performance testing was required for PM, CO, PCDD/PCDF, HCl, Pb, Cd, Hg, and opacity. In addition, the MDE required tests for $SO_2$ and $NO_x$.

Under contract to the United States Air Force Institute for Environmental Safety and Occupational Health Risk Analysis (AFIERA), Pacific Environmental Services, Inc. (PES) conducted the required testing during the period 31 January through 2 February 2001. The AFIERA point of contact and Technical Project Manager (TPM) for this delivery order was:

Major Jeanette Howard
USAF, AFIERA/RSEQ
2513 Kennedy Circle
Brooks AFB, TX 78235-5123
Telephone: (210) 536-4991
Facsimile: (210) 536-3945
E-mail jeanette.howard@brooks.af.mil

The Andrews AFB point of contact and Base Surveillance Monitor (BSM) for this delivery order was:

Mr. Allan Holtzman
Air Quality Program Manager
89 CES/CEV
3479 Fetchet Avenue
Andrews AFB, Maryland 20762-4803
Telephone: (301) 981-2337
Facsimile: (301) 981-7125
E-mail allan.holtzman@andrews.af.mil

The PES point of contact was:

Mr. Franklin Meadows
Pacific Environmental Services, Inc.
Post Office Box 12077
Research Triangle Park, NC 27709-2077
Telephone: (919) 941-0333
Facsimile: (919) 941-0234
E-mail: frank.meadows@pes.com

## 2.0 RESULTS SUMMARY

The emissions results summary is shown in Table 2.1.

**TABLE 2.1**

**EMISSIONS RESULTS SUMMARY**

| Run No./Date | 1 | 2 | 3 | Average | Standard[a] |
|---|---|---|---|---|---|
| Particulate Matter | 2/2 | 2/2 | 2/2 | | |
| mg/dscm@7% $O_2$ | 8 | 104 | 93 | 68 | 69 |
| Carbon Monoxide | 2/1 | 2/1 | 2/2 | | |
| ppmvd@7% $O_2$ | < 2 | < 2 | < 2 | < 2 | 40 |
| Dioxins/Furans | 1/31 | 1/31 | 2/1 | | |
| ng/dscm total CDD/CDF@7% $O_2$ | 1 | 1 | < 1 | < 1 | 125 |
| Hydrogen Chloride | 1/31 | 2/1 | 2/2 | | |
| ppmvd@7% $O_2$ | 23 | 3 | 9 | 12 | 100 |
| Sulfur Dioxide | 2/1 | 2/1 | 2/2 | | |
| ppmvd@7% $O_2$ | < 2 | 3 | < 2 | < 2 | 55 |
| Nitrogen Oxides | 2/1 | 2/1 | 2/2 | | |
| ppmvd@7% $O_2$ | 102 | 100 | 96 | 99 | 250 |
| Lead | 2/2 | 2/2 | 2/2 | | |
| mg/dscm@7% $O_2$ | 0.6 | 0.8 | 0.6 | 0.7 | 1.2 |
| Cadmium | 2/2 | 2/2 | 2/2 | | |
| mg/dscm@7% $O_2$ | 0 | 0.01 | 0.01 | 0.01 | .16 |
| Mercury | 2/2 | 2/2 | 2/2 | | |
| mg/dscm@7% $O_2$ | 0.09 | 0.01 | 0.00 | 0.03 | 0.55 |
| Visual Opacity, % | 2/2 | 2/2 | 2/2 | | |
| | 0-5 | 0-5 | 0-5 | 0-5 | 10 |

[a] MDE COMAR 26.11.08

## 3.0 SOURCE DESCRIPTION

The MWI is a Joy Energy Systems Model 480-E incinerator consisting of both a primary (lower) and a secondary (upper) combustion chamber. The primary chamber is equipped with an on/off natural gas burner and a manually adjusted underfire air blower. The secondary chamber is equipped with a modulating high/low natural gas burner. Additional combustion air is supplied by a modulating blower, located between the primary and secondary chambers. The primary and secondary combustion chambers operate at temperatures of approximately 1665°F and 1695°F, respectively.

The incinerator is utilized to burn Type O and infectious/pathological waste generated at the hospital. The rated capacity is 385 lb/hr. Loading of waste is accomplished with the use of a hopper/hydraulic ram mechanical waste feed system. Continuous monitoring instrumentation for the incinerator includes thermocouples and a circular chart recorder for recording primary and secondary combustion chamber temperature.

Particulate air emissions are controlled with an Airpol high energy venturi scrubber. Caustic sodium hydroxide is added to the scrubber to enhance removal of acid gases. The scrubber liquid is recirculated through the venturi system with a specified amount bled off and replaced with fresh make-up liquid. A stainless steel impact mist eliminator, located downstream of the venturi, helps control the amount of entrained water droplets carried over to the fan and stack. Continuous monitoring instrumentation for the scrubber includes a draft gage for measuring the pressure drop across the venturi, a thermocouple for measuring the venturi inlet gas temperature, a flow meter for measuring the scrubber liquid flow rate, and a meter for measuring the pH of the scrubber liquid.

## 4.0 SAMPLING LOCATION

The MWI is located in a single-story building. The stack extends vertically through the roof and to a height of about 10 feet above the roof. The sampling site for the manual sampling was located inside the MWI building in a 15-3/8 inch inner diameter (ID) round vertical stack, 170 inches (11.1 stack diameters) downstream of the nearest flow disturbance (fan outlet) and 175 inches (11.4 stack diameters) upstream of the nearest flow disturbance (atmosphere). According to EPA Method 1 criteria, this location requires 12 sample traverse points, 6 along each of 2 perpendicular diameters. Sampling was accomplished through two existing 3-inch ID test ports. The sample traverse point locations are shown in Figure 4.1. A separate test port for the portable continuous emission monitor (CEMs), which were used for the instrumental methods, was installed about 48 inches upstream of the manual methods sampling site. Access to the manual sampling location was provided by scaffold and staging, approved by the Occupational Safety and Health Administration (OSHA), erected by PES.

Although cyclonic flow conditions were not expected at the sampling locations, PES performed a check to verify the absence of cyclonic or nonparallel flow in accordance with the procedure specified in Section 2.4 of EPA Method 1. The results indicated an average angle of rotation of 0 degrees to obtain a null velocity reading.

# Circular Stack Method 1 Calculation Results

Date: 03/23/01 Time: 10:23:10

| | |
|---|---|
| Facility: | Malcolm Grow Med. Center MWI |
| Source ID: | C2 (MWI) |
| Source Name: | Joy Energy Systems MWI |
| Date: | 01/31/01 |
| Calculated By: | F. Meadows |

**Input Values**

| | | |
|---|---|---|
| Traverse Point Type: | Sample - M5 | |
| Inside of far wall to outside of nipple: | 17 3/8 | (inches) |
| Nipple Length: | 2 even | (inches) |
| Distance from Upstream Disturbance: | 170 even | (inches) |
| Distance from Downstream Disturbance: | 175 even | (inches) |
| Number of ports: | 2 ports at 90 degrees | |

**Calculated Values**

| | | |
|---|---|---|
| Inside Diameter: | 15.3750 | (inches) |
| **Upstream Duct Diameters:** | **11.05** | |
| **Downstream Duct Diameters:** | **11.38** | |
| **Mininum Traverse Points:** | **12** | |

| Traverse Point Number | Fraction of Length | Length (inches) | Product of Columns 2 & 3 | Nipple Length (inches) | Traverse Point Location Sum of Col. 4 & 5 |
|---|---|---|---|---|---|
| 1 | 0.044 | 15 3/8 | 0 11/16 | 2 even | 2 11/16 |
| 2 | 0.146 | 15 3/8 | 2 1/4 | 2 even | 4 1/4 |
| 3 | 0.296 | 15 3/8 | 4 9/16 | 2 even | 6 9/16 |
| 4 | 0.704 | 15 3/8 | 10 13/16 | 2 even | 12 13/16 |
| 5 | 0.854 | 15 3/8 | 13 1/8 | 2 even | 15 1/8 |
| 6 | 0.956 | 15 3/8 | 14 11/16 | 2 even | 16 11/16 |

**Figure 4.1 MWI Sample Traverse Point Locations**

## 5.0 SAMPLING AND ANALYTICAL PROCEDURES

Table 5.1 summarizes the test parameters, test methods, number of tests, and duration of each sampling event. Brief descriptions of the methods conducted are provided below.

### 5.1 LOCATION OF MEASUREMENT SITES AND SAMPLE /VELOCITY TRAVERSE POINTS

EPA Method 1, "Sample and Velocity Traverses for Stationary Sources," was used to select the measurement site and to establish velocity and sample traverse point locations. The measurement site is discussed in Section 4.0.

### 5.2 DETERMINATION OF STACK GAS VOLUMETRIC FLOW RATE

EPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)," was used to determine stack gas volumetric flow rate. A Type S pitot tube, constructed according to Method 2 criteria and having an assigned coefficient of 0.84, connected to an inclined-vertical manometer, was used to measure velocity pressure. A calibrated Type K thermocouple attached directly to the pitot tube was used to measure stack gas temperature. The average stack gas velocity was calculated from the average square roots of the velocity pressure, average stack gas temperature, stack gas molecular weight, and absolute stack pressure. The volumetric flow rate is the product of stack gas velocity and the stack cross-sectional area.

## TABLE 5.1

## TEST PARAMETERS AND TEST METHODS SUMMARY

| Parameter | EPA Test Methods | No. of Tests | Time per Test (minutes) |
|---|---|---|---|
| Volumetric Flow Rate | 1 & 2 | 3 | 240 |
| Molecular Weight, Emission Correction Factors | 3A | -[a] | -[a] |
| Moisture | 4 | 6[b] | 3 @ 60 each<br>3 @ 240 each |
| Sulfur Dioxide | 6C | 3 | 60 |
| Nitrogen Oxides | 7E | 3 | 60 |
| Carbon Monoxide | 10 | 3 | 60 |
| Dioxin/Furan (PCDD/PCDF) | 23 | 3 | 240 |
| Particulate Matter/Metals | 5/29 | 3 | 60 |
| Hydrogen Chloride | 26 | 3 | 60 |

[a] Continuous with all manual and CEM pollutant measurement runs.

[b] Moisture content was determined using both the M23 and M5/29 sample trains.

## 5.3 DETERMINATION OF DRY MOLECULAR WEIGHT AND EMISSION CORRECTION FACTORS

EPA Method 3A, "Determination of Oxygen and Carbon Dioxide Concentration in Emissions From Stationary Sources (Instrumental Analyzer Procedure)," was used to determine oxygen ($O_2$) and carbon dioxide ($CO_2$) content of the stack gas. This procedure was part of the extractive continuous emission monitoring apparatus described in Section 5.8.

## 5.4 DETERMINATION OF STACK GAS MOISTURE CONTENT

EPA Method 4, "Determination of Moisture Content in Stack Gases," was used to determine stack gas moisture content. Moisture was determined using both the EPA Method 23 and EPA Method 29 sample trains. The quantity of condensed water was determined gravimetrically and then compared to the dry volume of gas sampled to determine the volume % moisture content. The moisture values obtained from the Method 23 and Method 29 sample trains were also used to adjust the $SO_2$, $NO_x$, and CO concentrations to 7% $O_2$.

## 5.5 DETERMINATION OF POLYCHLORINATED DIBENZO-P-DIOXINS AND POLYCHLORINATED DIBENZOFURANS

EPA Method 23, "Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans From Stationary Sources," was used to determine total PCDD/PCDF. Samples were withdrawn from the gas stream isokinetically and collected via the sample probe onto a glass fiber filter, followed by a packed column of XAD-2 adsorbent material. The PCDD/PCDF were extracted from the samples and analyzed using high resolution gas chromatography/mass spectrometry (GC/MS). PES selected Alta Analytical Perspectives (Alta),

Wilmington, North Carolina, to prepare the filters and adsorbent traps and to perform the required analyses.

A schematic of the Method 23 sampling apparatus is shown in Figure 5.1. Each measurement run was 4 hours in duration, as required by 40 CFR, Part 60, Subpart Ec, Paragraph 60.56c(b)(9).

## 5.6 DETERMINATION OF HYDROGEN CHLORIDE

EPA Method 26, "Determination of Hydrogen Chloride Emissions From Stationary Sources," was used to determine HCl emissions. An integrated sample was withdrawn from the stack and passed through a prepurged heated probe and filter into a series of midget impingers containing dilute sulfuric acid and dilute sodium hydroxide solutions, which collected gaseous hydrogen halides and halogens. A schematic of the Method 26 sampling train is shown in Figure 5.2. Each measurement run was 1 hour in duration. PES selected First Analytical Laboratories (FAL), Chapel Hill, North Carolina, to perform the required analyses.

## 5.7 DETERMINATION OF PARTICULATE MATTER AND METALS

EPA Method 29, "Determination of Metals Emissions From Stationary Sources," was used to determine filterable particulate matter and metals. The target metals included Cd, Pb, and Hg. Samples were withdrawn from the gas stream isokinetically and collected via the sample probe onto a tared quartz-fiber filter, followed by a series of impingers containing aqueous acidic solutions of hydrogen perioxide (analyzed for Cd and Pb) and an aqueous acidic solution of potassium permanganete (analyzed for Hg). The probe filter fractions were analyzed

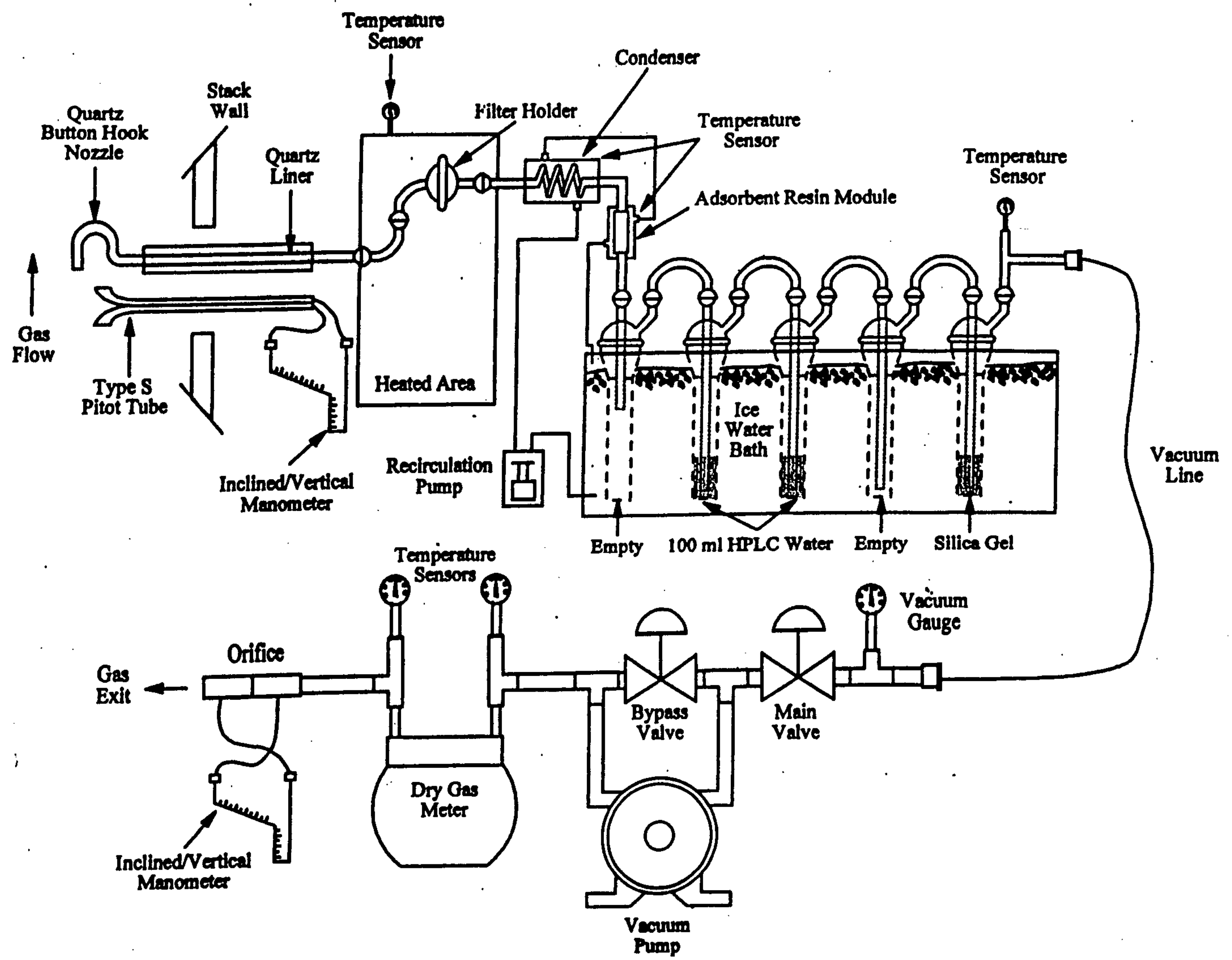



**Figure 5.1 EPA Method 23 Sampling Apparatus**

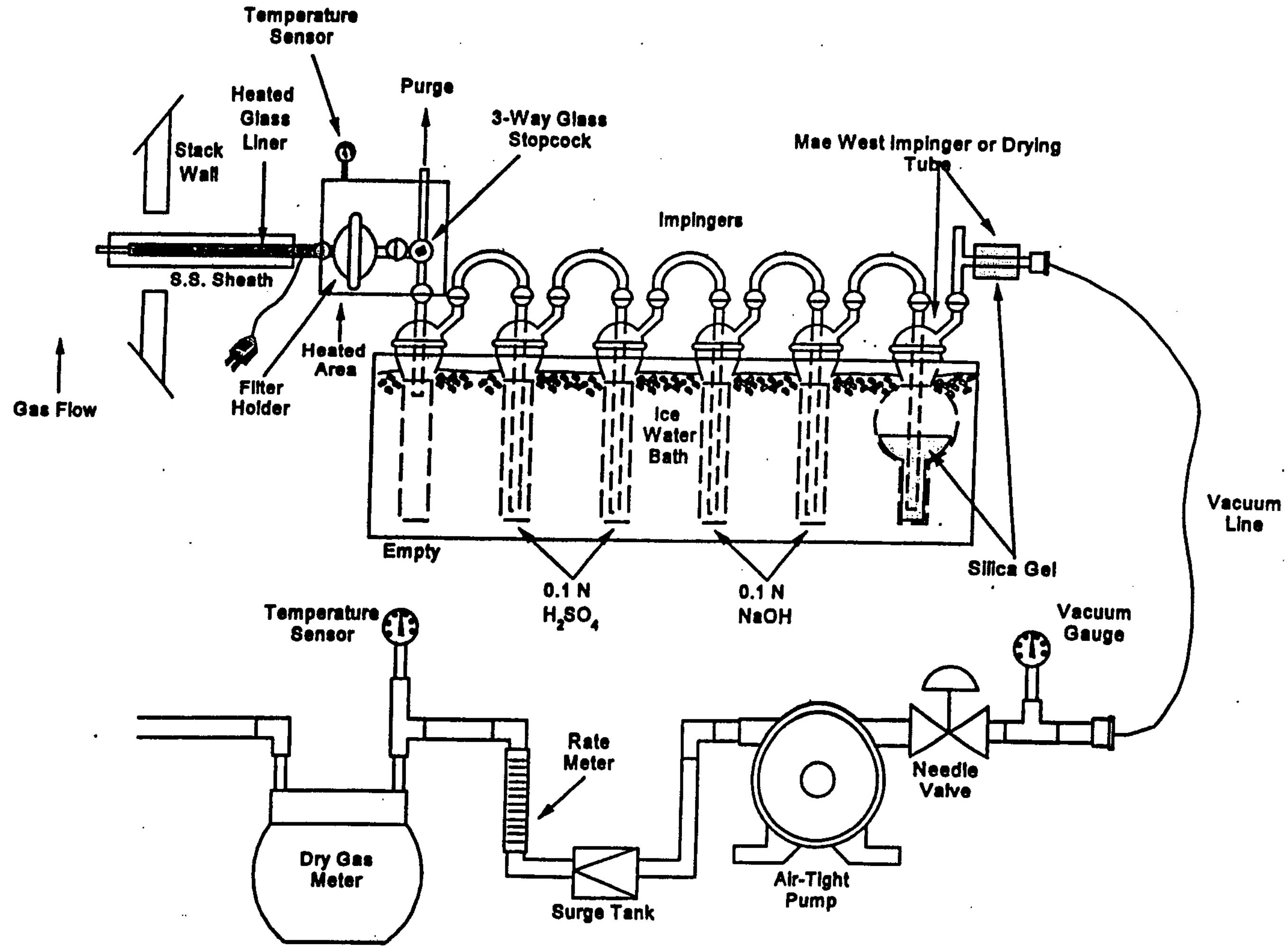



Figure 5.2 EPA Method 26 Hydrogen Chloride Sampling Apparatus

gravimetrically in the PES laboratory in Research Triangle Park, North Carolina, to determine filterable particulate matter. Upon completion of the particulate matter analyses, the particulate fractions and aqueous fractions were submitted to FAL for the metals analyses.

A schematic of the Method 29 sampling train is shown in Figure 5.3. Each measurement run was 1 hour in duration.

## 5.8 SULFUR DIOXIDE, OXIDES OF NITROGEN, AND CARBON MONOXIDE

$SO_2$, $NO_x$, and CO concentrations were measured using instrumental analyzers in accordance with EPA Methods 6C, 7E, and 10. An extractive sampling system was setup as shown in Figure 5.4. Although EPA Methods 6C, 7E, and 10 require a heated sample probe, Bill Reamy of the MDE approved the use of an unheated sample probe. This deviation from the method eliminated the need to install costly additional test ports in the stack. The sampling system consisted of a short sample probe about 8 inches in length, a heated out-of-stack filter, a calibration valve assembly, a short heated Teflon® sample line, a sample gas conditioner (chiller), an unheated Teflon® sample transport line, and a sample gas manifold to direct the sample gas to the analyzers.

The $SO_2$ analyzer was a Western Research Model 721 ATM unit that uses the analytical technique of ultraviolet fluorescence. The instrument had user-defined ranges of 50 to 5000 parts per million by volume (ppmv). The instrument was calibrated using $SO_2$-in-nitrogen ($N_2$) calibration gases prepared in accordance with EPA Protocol. Two upscale calibration gases corresponding to 40-60 and 80-100% of span and zero gas (ambient air) were used. The instrument was operated on a 0-100 ppmv range.

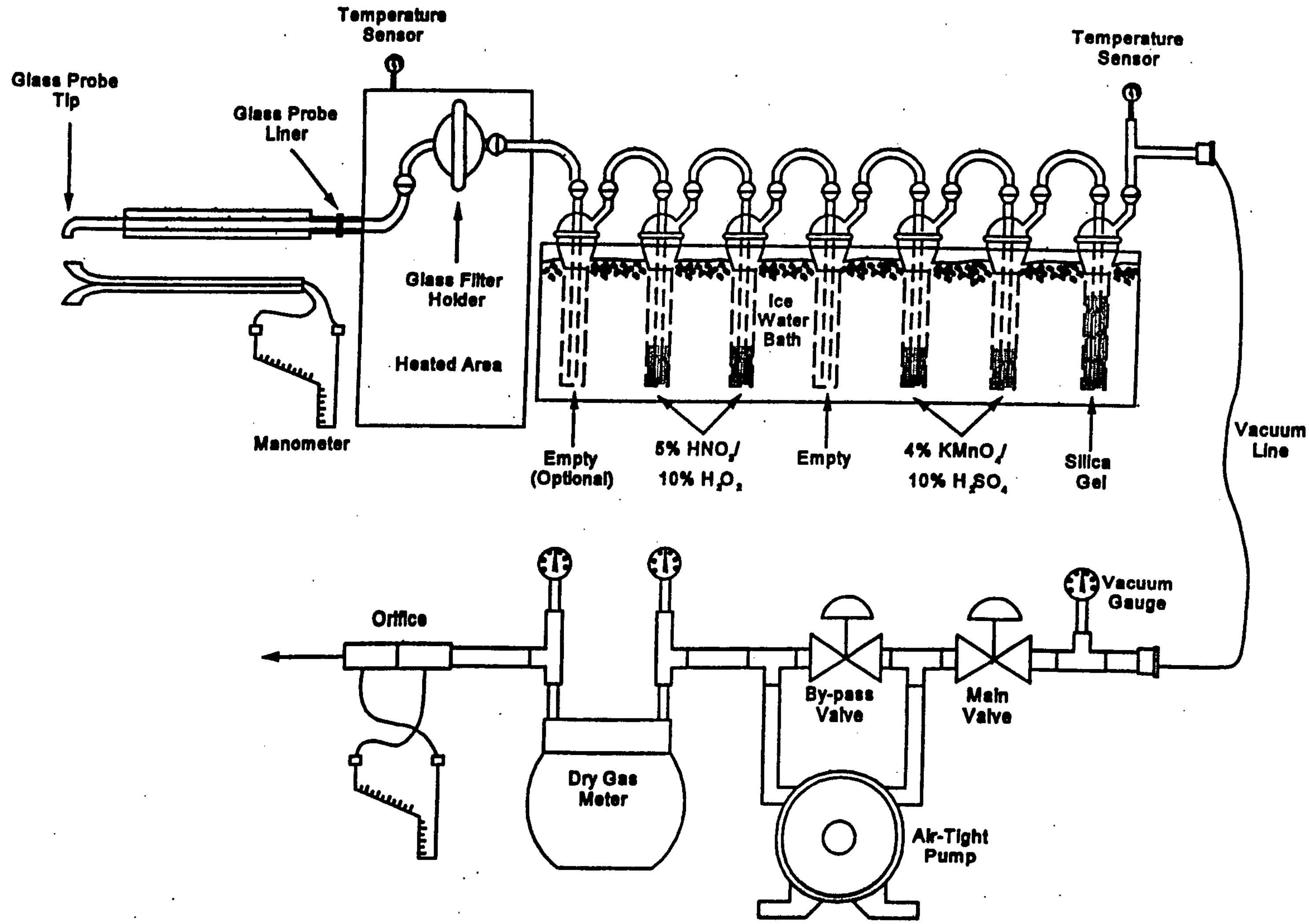



Figure 5.3 EPA Method 5/29 Particulate Matter/Metals Sampling Apparatus

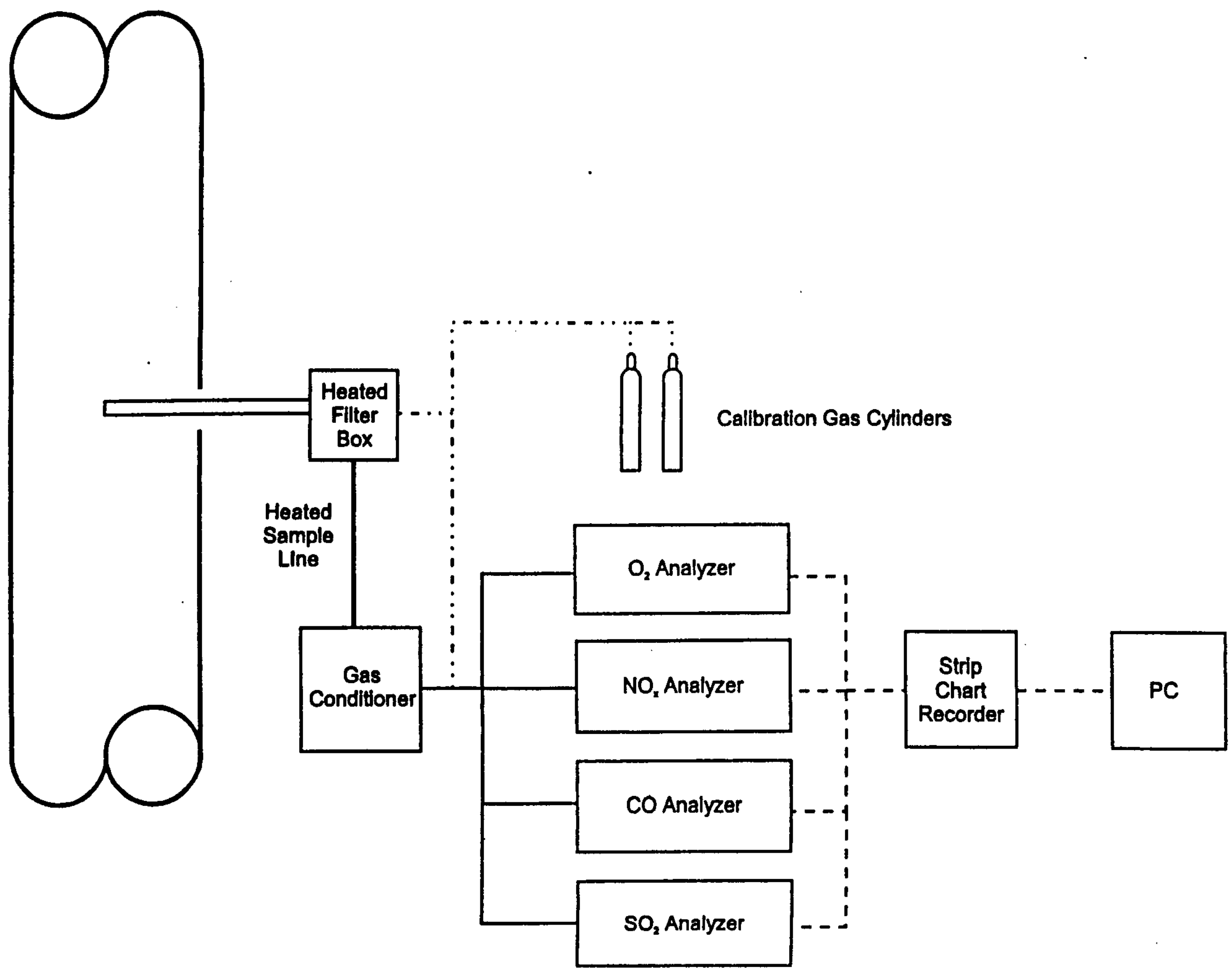



**Figure 5.4 EPA Methods 3A, 6C, 7E, and 10 Instrumental Methods Extractive Sampling/Monitoring System**

The $NO_x$ analyzer was an API unit that uses the principle of chemiluminescence to determine the $NO_x$ concentration continuously. The instrument was operated on the range of 0-500 ppmv as nitrogen oxide (NO). The instrument was calibrated using NO-in-$N_2$ calibration gases prepared in accordance with EPA Protocol. Two upscale calibration gases corresponding to 40-60 and 80-100% of span, and zero gas (ambient air) were used. Prior to testing, the $NO_2$ to NO conversion efficiency was checked in accordance with the procedures in
Section 5.6.1 of EPA Method 20.

The CO analyzer was a Thermo Environmental Instruments Model 48C Gas Filter Correlation (GFC) unit that uses the principle of infrared absorption. The GFC system responds specifically to CO, so it was not necessary to make a $CO_2$ correction as specified in Section 9 of Method 10. The instrument was operated on the range of 0-100 ppmv. The instrument was calibrated using three upscale CO-in-$N_2$ calibration gases corresponding to approximately 30, 60, and 90% of span. Prepurified $N_2$ was used for the zero gas. The gases were certified by the manufacturer to be within $\pm 2\%$ of the specified concentration.

Pretest preparations included calibration error checks, sampling system bias checks, and response time checks for the respective analyzers. Post-test checks included zero and calibration drift tests. The output signal from each instrument was continuously recorded using a strip chart recorder and data logger.

## 5.9 DETERMINATION OF VISUAL OPACITY

EPA Method 9, "Visual Determination of the Opacity of Emissions From Stationary Sources," was used to determine visual opacity. PES provided a certified observer to observe and record opacity of the plume where condensed water was not present.

# 6.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

This section describes the specific quality assurance/quality control (QA/QC) procedures employed by PES in performing this series of tests. The goals of the QA/QC activities for this project were intended to ensure, to the highest degree possible, the accuracy of the data collected. The procedures contained in the "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods," EPA-600/R-94/038C, served as the basis for the performance of all testing and related work activities on this project. All calibration requirements were met by the sampling equipment used to conduct this test program.

## 6.1 CALIBRATION OF APPARATUS

The preparation and calibration of source sampling equipment is essential in maintaining data quality. Brief descriptions of the calibration procedures used by PES are presented below.

### 6.1.1 Barometers

PES uses aneroid barometers that are calibrated against a station pressure value reported by a nearby National Weather Service Station, corrected for elevation.

### 6.1.2 Temperature Sensors

Bimetallic dial thermometers and Type K thermocouples are calibrated using the procedure described in Section 3.4.2 of EPA's Quality Assurance Handbook.

Each temperature sensor was calibrated over the expected range of use against an American Society for Testing Materials (ASTM) 3C or 3F thermometer. Table 6.1 summarizes the types of calibrations performed and the acceptable levels of variance. Potentiometers were calibrated using a thermocouple simulator having a range of 0-2400°F.

### 6.1.3 Pitot Tubes

PES used Type S pitot tubes that were constructed to EPA Method 2 specifications. Pitot tubes meeting these criteria are assigned a baseline coefficient of 0.84 and need not be calibrated.

### 6.1.4 Differential Pressure Gages

PES used Dwyer inclined and inclined/vertical manometers to measure differential pressures. These parameters included velocity pressure, static pressure, and meter orifice pressure. Manometers were selected with sufficient sensitivity to accurately measure pressures over the entire range of expected values. Manometers are primary standards and require no calibration.

### 6.1.5 Dry Gas Meters and Orifices

Dry gas meters and orifices were calibrated in accordance with Section 3.3.2 of EPA's Quality Assurance Handbook. This procedure involved direct comparison of the dry gas meter to a reference dry test meter. The reference dry test meter was calibrated using a wet test meter or a liquid displacement technique. Before its initial use in the field, the metering system was calibrated over the entire range of operation. After each field use, the metering system was calibrated at a single intermediate setting based on the previous field test.

## TABLE 6.1

## SUMMARY OF TEMPERATURE CALIBRATIONS

| Temperature Sensor | Number of Calibration Points | CALIBRATION MEDIA | | | | | Tolerances |
|---|---|---|---|---|---|---|---|
| | | Ice Bath (0°C) | Ambient Air (20-25°C) | Hot Water (40-50°C) | Boiling Water (100°C) | Heated Oil (150-200°C) | |
| Impinger Outlet Thermocouple | 2 | * | * | | | | ±1°C |
| Dry Gas Meter Thermometer | 2 | | * | * | | | ±3°C |
| Stack Temperature Sensor | 3 | * | | | * | * | ±1.5°C of reference temperature |

*: designates calibration point.

Acceptable tolerances for the initial and final dry gas meter factors and orifice calibration factors are ± 0.02 and ± 0.20 from average, respectively.

## 6.2 ON-SITE QA/QC

The on-site QA/QC activities are discussed below.

### 6.2.1 Measurement Sites

Prior to sampling, all stack dimensions were checked to verify measurement site locations, location of test ports, and inside stack dimensions. Inside dimensions were checked through all available test ports to verify uniformity of the stack cross-sectional area, and the sample test ports were checked to verify that they did not extend beyond the inside wall. The inside stack dimensions, wall thickness, and sample port depths were measured to the nearest 1/16 inch.

### 6.2.2 Velocity Measurements

All velocity measurement apparatus was assembled, leveled, zeroed, and leak-checked prior to use and at the end of each determination. The static pressure was determined at a single point near the center of the stack cross section.

### 6.2.3 Integrated Flue Gas Sampling

Integrated multipoint flue gas samples were collected in Tedlar® gas bags by traversing the stack cross-sectional area simultaneously with each PM/metals and PCDD/PCDF measurement run. The sample train was assembled and

leak-checked before and after each test run. Prior to each test run, the gas bags were leak-checked and purged with nitrogen to ensure that no contamination of the sample occurred.

During sampling, Fyrite® combustion gas analyzers were used to determine % concentrations of $CO_2$ and $O_2$. These instruments were used as a confirmatory technique for the Orsat analysis.

### 6.2.4 Moisture

Stack gas moisture content was determined simultaneously using both the PM/metals and the PCDD/PCDF sample trains. During sampling, the exit gas of the last impinger was maintained below 68°F to ensure complete condensation of the stack gas water vapor. The total moisture was determined gravimetrically and included the condensate collected in the Method 23 adsorbent trap.

### 6.2.5 Sulfur Dioxide, Oxides of Nitrogen, and Carbon Monoxide Instrumental Methods

The on-site QC requirements for EPA Methods 6C, 7E, and 10 included the following:

> Analyzer Calibration Error – Less than ±2% of the span for the zero, mid-range, and high-range calibration gases.
>
> Sampling System Bias – Less than ±5% of the span for the zero and mid- or high-range calibration gases.

Calibration Drift - Less than $\pm 3\%$ of the span over the period of each run.

EPA Methods 6C and 7E required the use of calibration gases prepared according to EPA Protocol and certified to be within $\pm 1\%$ of the specified concentrations. EPA Method 10 required the use of calibration gases that were certified to be within $\pm 2\%$ of the specified concentrations. Additional QC checks included up- and down-scale response time checks.

### 6.2.6 Dioxin/Furan (PCDD/PCDF)

The field sampling QA/QC procedures were similar to those for PM/metals. The adsorbent cartridges were spiked with surrogate standards in the laboratory prior to collecting the field samples.

### 6.2.7 Particulate Matter/Metals and Hydrogen Chloride

The field sampling QA/QC procedures included the cleaning and preparation of all sampling train glassware and sample containers, use of prescribed reagents and filters, pre- and post-test leak checks of the sampling apparatus, sample recovery as prescribed in the proposed method, and retention of unused filters and reagents for use as blanks.

### 6.2.8 Sample Handling and Chain-of-Custody

All samples not analyzed on site (PCDD/PCDF, HCl, PM/metals) were logged into a master logbook and given an alpha-numeric identification code. The samples were clearly labeled and sealed. Samples were stored in an area of limited access. Upon completion of the particulate analyses in the PES laboratory in Research

Triangle Park, North Carolina, the PCDD/PCDF, HCl, and metals samples were hand-delivered to PES' contract laboratories for analyses. A chain-of-custody report form accompanied all samples delivered to each laboratory and documented all handling through final disposition.

## 6.3 ANALYSIS

### 6.3.1 Particulate Matter/Metals

Analysis for particulate matter was performed in the PES laboratory. Field blanks of acetone were taken directly from the wash bottle used in recovering the samples. Three (3) blank filters were also exposed and handled at the sample recovery site. The acetone blank and filter blanks were submitted to the laboratory and analyzed with the samples.

Upon receipt of the samples at the PES laboratory, the samples and blanks were analyzed in strict accordance with Section 4.3 of EPA Method 5. Prior to any weighings, PES' analytical balance was checked for calibration with known weights.

The sample and blank filters were placed in a tared glass weighing dish and desiccated for 24 hours in a desiccator containing anhydrous calcium sulfate. The filters were weighed to a constant weight and the results reported to the nearest 0.1 mg. The term "constant weight" means a difference of no more than 0.5 mg or 1% of total weight less tare weight, whichever is greater, between two consecutive weighings, with no less than 6 hours of desiccation time between weighings. The sample and blank acetone solutions were checked to confirm the level of liquid in the containers in order to determine whether or not leakage occurred during transport. If a noticeable amount of leakage had occurred, the

sample was voided, or other methods were used such as adjusting the final analysis for the amount of spillage. The liquid in each sample container was measured gravimetrically to ± 0.5 g. The contents were transferred to a tared 250-ml beaker and evaporated to dryness at ambient temperature and pressure. The beakers were then desiccated for 24 hours and weighed to a constant weight. The results were reported to the nearest 0.1 mg. Filterable particulate matter was the sum of the particulate matter in the acetone rinse (blank corrected) and that caught on the filter.

Upon completion of the particulate analyses, these samples, along with the metals train aqueous samples, were hand-delivered to FAL for determination of the target metals following the analytical and quality control procedures prescribed in Method 29. The samples were delivered to FAL within 6 working days after the completion of the field tests. The analyses were performed within 21 working days after receipt of the samples by FAL.

### 6.3.2 Dioxin/Furan (PCDD/PCDF)

The PCDD/PCDF samples were submitted to Alta for analysis following the procedures prescribed in Section 5 of Method 23 and proposed revisions. GC/MS system checks included initial calibration and daily performance checks. Specific QC checks included the determination of internal standard recovery efficiencies and the determination of surrogate recoveries. Recoveries of internal standards must be between 40 to 130% for the tetra-through hexachlorinated compounds, while the range is 25 to 130% for the higher hepta- and octachlorinated homologues. Surrogate recovery efficiencies were required to be between 70 and 130%.

# ͺPPENDIX A

# .OCESS DATA

## INCINERATOR OPERATION

| ERATOR | DATE | TIME | WEIGHT | PRIMARY | SECONDARY | BOXES |
|---|---|---|---|---|---|---|
| [illegible] | 1-31-01 | 112 | 54 | 1881 | 1796 | 2 |
| [illegible] | 1-31-01 | 125 | 49 | 1874 | 1798 | 2 |
| [illegible] | 1-31-01 | 135 | 52 | 1860 | 1797 | 2 |
| [illegible] | 1-31-01 | 146 | 48 | 1860 | 1796 | 2 |
| [illegible] | 1-31-01 | 159 | 52 | 1855 | 1792 | 2 |
| [illegible] | 1-31-01 | 214 | 48 | 1666 | 1778 | 2 |
| [illegible] | 1-31-01 | 227 | 55 | 1612 | 1782 | 2 |
| [illegible] | 1-31-01 | 240 | 60 | 1645 | 1782 | 2 |
| [illegible] | 1-31-01 | 250 | 48 | 1968 | 1921 | 2 |
| [illegible] not testing | 1-31-01 | 336 | 40 | 1193 | 1729 | 2 |
| [illegible] not testing | 1-31-01 | 348 | 38 | 1456 | 1761 | 2 |
| [illegible] not testing | 1-31-01 | 404 | 36 | 1342 | 1744 | 2 |
| [illegible] | 1-31-01 | 415 | 54 | 1479 | 1771 | 2 |
| [illegible] | 1-31-01 | 425 | 58 | 1605 | 1724 | 2 |
| [illegible] | 1-31-01 | 439 | 52 | 1633 | 1776 | 2 |
| [illegible] | 1-31-01 | 452 | 60 | 1710. | 1780 | 2 |
| [illegible] | 1-31-01 | 502 | 54 | 1948 | 1813 | 2 |
| | | | 850 | | | |

## INCINERATOR OPERATION

| ERATOR | DATE | TIME | WEIGHT | PRIMARY | SECODNARY | BOXES |
|---|---|---|---|---|---|---|
| [illegible] | 1-31-01 | 513 | 51 | 2000 | 1759 | 2 |
| [illegible] | 1-31-01 | 523 | 54 | 1960 | 1802 | 2 |
| [illegible] | 1-31-01 | 540 | 50 | 1604 | 1764 | 2 |
| [illegible] | 1-31-01 | 550 | 57 | 1785 | 1800 | 2 |
| [illegible] | 1-31-01 | 603 | 52 | 1796 | 1782 | 2 |
| [illegible] | 1-31-01 | 614 | 54 | 1896 | 1797 | 2 |
| [illegible] | 1-31-01 | 624 | 51 | 1898 | 1797 | 2 |
| [illegible] | 1-31-01 | 638 | 53 | 1707 | 1779 | 2 |
| [illegible] | 1-31-01 | 649 | 60 | 1957 | 1804 | 2 |
| [illegible] | 1-31-01 | 700 | 51 | 2052 | 1837 | 2 |
| [illegible] | 1-31-01 | 712 | 49 | 1898 | 1800 | 2 |
| [illegible] | 1-31-01 | 723 | 60 | 1962 | 1802 | 2 |
| [illegible] | 1-31-01 | 733 | 57 | 1821 | 1789 | 2 |
| [illegible] | 1-31-01 | 746 | 46 | 1580 | 1780 | 2 |
| [illegible] | 1-31-01 | 756 | 52 | 1874 | 1801 | 2 |
| [illegible] | 1-31-01 | 806 | 49 | 1961 | 1829 | 2 |
| | 1-31-01 | 816 | 51 | 1870 | 1806 | 2 |
| | | | 897 | | | 34 |

## INCINERATOR OPERATION

| ERATOR | DATE | TIME | WEIGHT | PRIMARY | SECODNARY | BOXES |
|---|---|---|---|---|---|---|
| [illegible] | 1-31-01 | 826 | 33 | 1886 | 1804 | 2 |
| [illegible] wt 14,820 | 1-31-01 | 839 | 50 | 1890 | 1802 | 2 |
| [illegible] | 2-1-01 | 905 | 55 | 1462 | 1951 | 2 |
| [illegible] | 2-1-01 | 916 | 51 | 1470 | 1750 | 2 |
| [illegible] | 2-1-01 | 929 | 49 | 1402 | 1759 | 2 |
| [illegible] | 2-1-01 | 939 | 47 | 1480 | 1746 | 2 |
| [illegible] | 2-1-01 | 949 | 50 | 1652 | 1760 | 2 |
| [illegible] | 2-1-01 | 959 | 48 | 1876 | 1790 | 2 |
| [illegible] | 2-1-01 | 1010 | 46 | 1818 | 1788 | 2 |
| [illegible] | 2-1-01 | 1021 | 49 | 1869 | 1789 | 2 |
| [illegible] | 2-1-01 | 1032 | 47 | 1720 | 1720 | 2 |
| [illegible] | 2-1-01 | 1042 | 49 | 1830 | 1785 | 2 |
| [illegible] | 2-1-01 | 1052 | 47 | 1820 | 1780 | 2 |
| [illegible] | 2-1-01 | 1102 | 45 | 1760 | 1784 | 2 |
| [illegible] | 2-1-01 | 1114 | 43 | 1772 | 1781 | 2 |
| [illegible] | 2-1-01 | 1125 | 60 | 1679 | 1779 | 2 |
| [illegible] | 2-1-01 | 1141 | 40 | 1910 | 1790 | 2 |
| | | | 889 | | | 30 |

boxes
713

## INCINERATOR OPERATION

| 'ERATOR | DATE | TIME | WEIGHT | PRIMARY | SECODNARY | BOXES |
|---|---|---|---|---|---|---|
| [illegible] | 2-1-01 | 1152 | 46 | 1851 | 1785 | 2 |
| [illegible] | 2-1-01 | 1204 | 48 | 1682 | 1767 | 2 |
| [illegible] | 2-1-01 | 1216 | 45 | 1800 | 1794 | 2 |
| [illegible] | 2-1-01 | 1226 | 47 | 1701 | 1725 | 2 |
| [illegible] | 2-1-01 | 1237 | 52 | 1691 | 1763 | 2 |
| [illegible] | 2-1-01 | 1252 | 48 | 1561 | 1265 | 2 |
| [illegible] | 2-1-01 | 103 | 49 | 1970 | 1870 | 3 |
| [illegible] not a test | 2-1-01 | 138 | 38 | 1401 | 1738 | 1 |
| [illegible] not a test | 2-1-01 | 151 | 36 | 1432 | 1761 | 2 |
| [illegible] | 2-1-01 | 221 | 50 | 1188 | 1700 | 2 |
| [illegible] | 2-1-01 | 231 | 52 | 1502 | 1757 | 2 |
| [illegible] | 2-1-01 | 242 | 49 | 1466 | 1766 | 2 |
| [illegible] | 2-1-01 | 253 | 53 | 1641 | 1750 | 2 |
| [illegible] | 2-1-01 | 305 | 57 | 1596 | 1763 | 2 |
| [illegible] not testing | 2-1-01 | 319 | 37 | 1597 | 1769 | 2 |
| [illegible] not testing | 2-1-01 | 334 | 39 | 1410 | 1750 | 2 |
| [illegible] not testing | 2-1-01 | 344 | 37 | 1470 | 1745 | 3 |

783

34

10:50 Am

Bob came on 2-2-01 scubble chart not printing

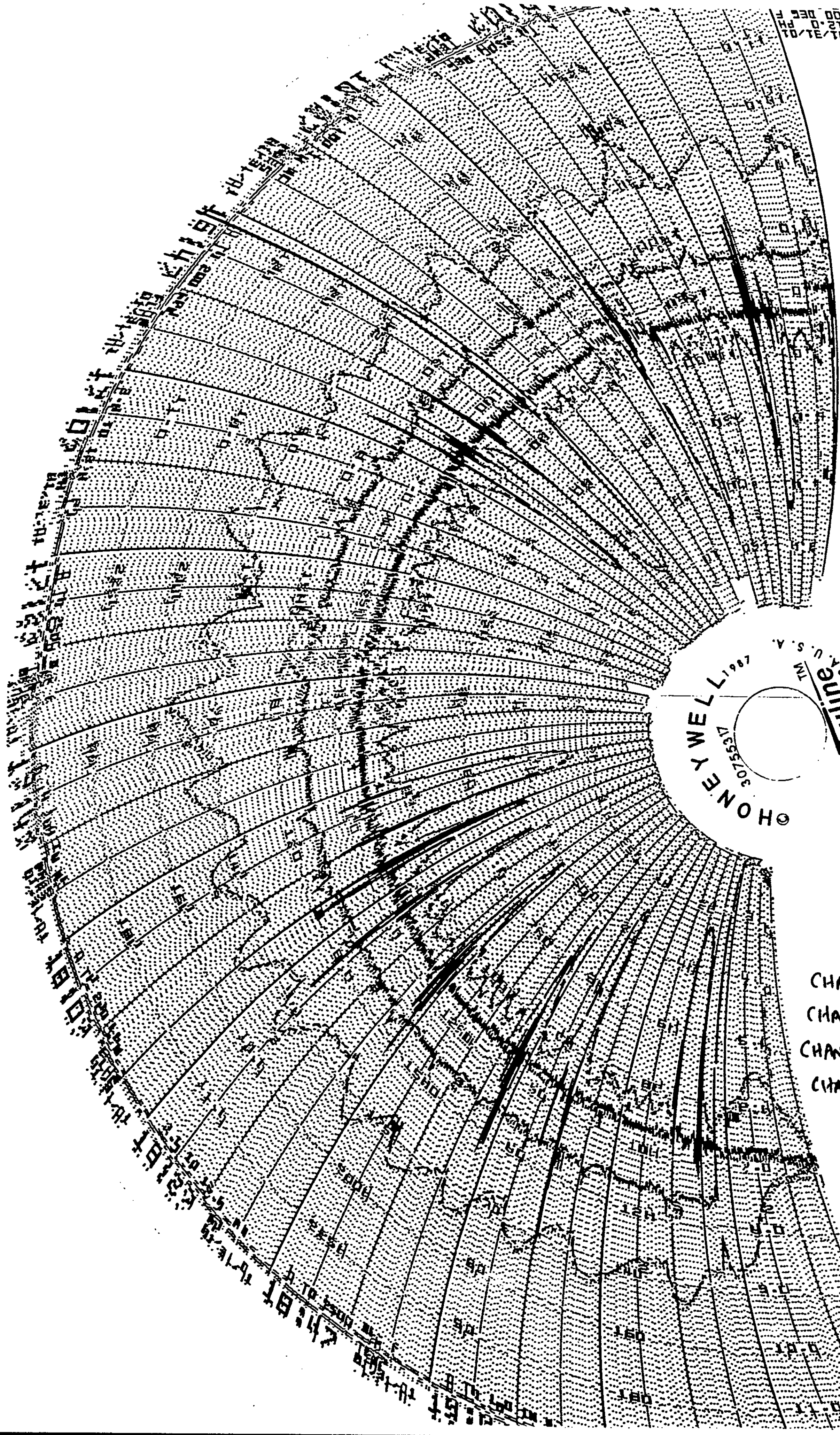
INCINERATOR OPERATION

| ERATOR | DATE | TIME | WEIGHT | PRIMARY | SECODNARY | BOXES |
|---|---|---|---|---|---|---|
| [illegible] not testing | 2-1-01 | 406 | 37 | 1376 | 1755 | 2 |
| [illegible] | 2-2-01 | 848 | 53 | 1443 | 1934 | 2 |
| [illegible] | 2-2-01 | 859 | 56 | 1493 | 1765 | 2 |
| [illegible] | 2-2-01 | 911 | 49 | 1412 | 1743 | 2 |
| [illegible] not testing | 2-2-01 | 929 | 38 | 1310 | 1746 | 2 |
| [illegible] | 2-2-01 | 944 | 48 | 1411 | 1713 | 2 |
| [illegible] | 2-2-01 | 954 | 51 | 1462 | 1753 | 2 |
| [illegible] | 2-2-01 | 1004 | 53 | 1686 | 1767 | 2 |
| [illegible] | 2-2-01 | 1015 | 49 | 1850 | 1781 | 2 |
| [illegible] | 2-2-01 | 1025 | 47 | 1851 | 1772 | 2 |
| [illegible] | 2-2-01 | 1035 | 50 | 1856 | 1782 | 2 |
| [illegible] | 2-2-01 | 1048 | 60 | 1760 | 1788 | 2 |
| [illegible] | 2-2-01 | 1100 | 58 | 1795 | 1777 | 2 |
| [illegible] | 2-2-01 | 1229 | 49 | 1357 | 1730 | 2 |
| [illegible] | 2-2-01 | 140 | 48 | 1646 | 1751 | 2 |
| [illegible] | 2-2-01 | 150 | 50 | 1697 | 1782 | 2 |
| [illegible] | 2-2-01 | 200 | 50 | 1703 | 1786 | 2 |
| | | | 846 | | | 34 |

INCINERATOR OPERATION

| ERATOR | DATE | TIME | WEIGHT | PRIMARY | SECODNARY | BOXES |
|---|---|---|---|---|---|---|
| [illegible] | 2-2-01 | 111 | 68 | 1676 | 1769 | 2 |
| [illegible] | 2-2-01 | 124 | 45 | 1809 | 1793 | 2 |
| [illegible] | 2-2-01 | 138 | 43 | 1881 | 1806 | 2 |
| [illegible] | 2-2-01 | 148 | 40 | 1888 | 1805 | 2 |
| [illegible] | 2-2-01 | 200 | 59 | 1700 | 1782 | 2 |
| [illegible] | 2-2-01 | 210 | 46 | 1854 | 1795 | 2 |
| [illegible] | 2-2-01 | 228 | 44 | 1510 | 1710 | 3 |
| [illegible] | 2-2-01 | 238 | 40 | 1605 | 1773 | 2 |
| [illegible] | 2-2-01 | 258 | 44 | 1750 | 1782 | 2 |
| [illegible] | 2-2-01 | 302 | 47 | 1740 | 1786 | 1 |
| [illegible] | 2-2-01 | 312 | 40 | 1850 | 1802 | 1 |
| [illegible] | 2-5-01 | 758 | 44 | 1441 | 1920 | 2 |
| [illegible] | 2-5-01 | 810 | 42 | 1246 1462 | 1708 | 2 |
| [illegible] | 2-5-01 | 820 | 44 |  | 1711 | 2 |
| [illegible] | 2-5-01 | 829 | 41 | 1412 | 1716 | 2 |
| [illegible] | 2-5-01 | 839 | 38 | 1418 | 1718 | 2 |
| [illegible] | 2-5-01 | 849 | 43 | 1420 | 1715 | 2 |
|  |  |  | 760 |  |  | 35 |

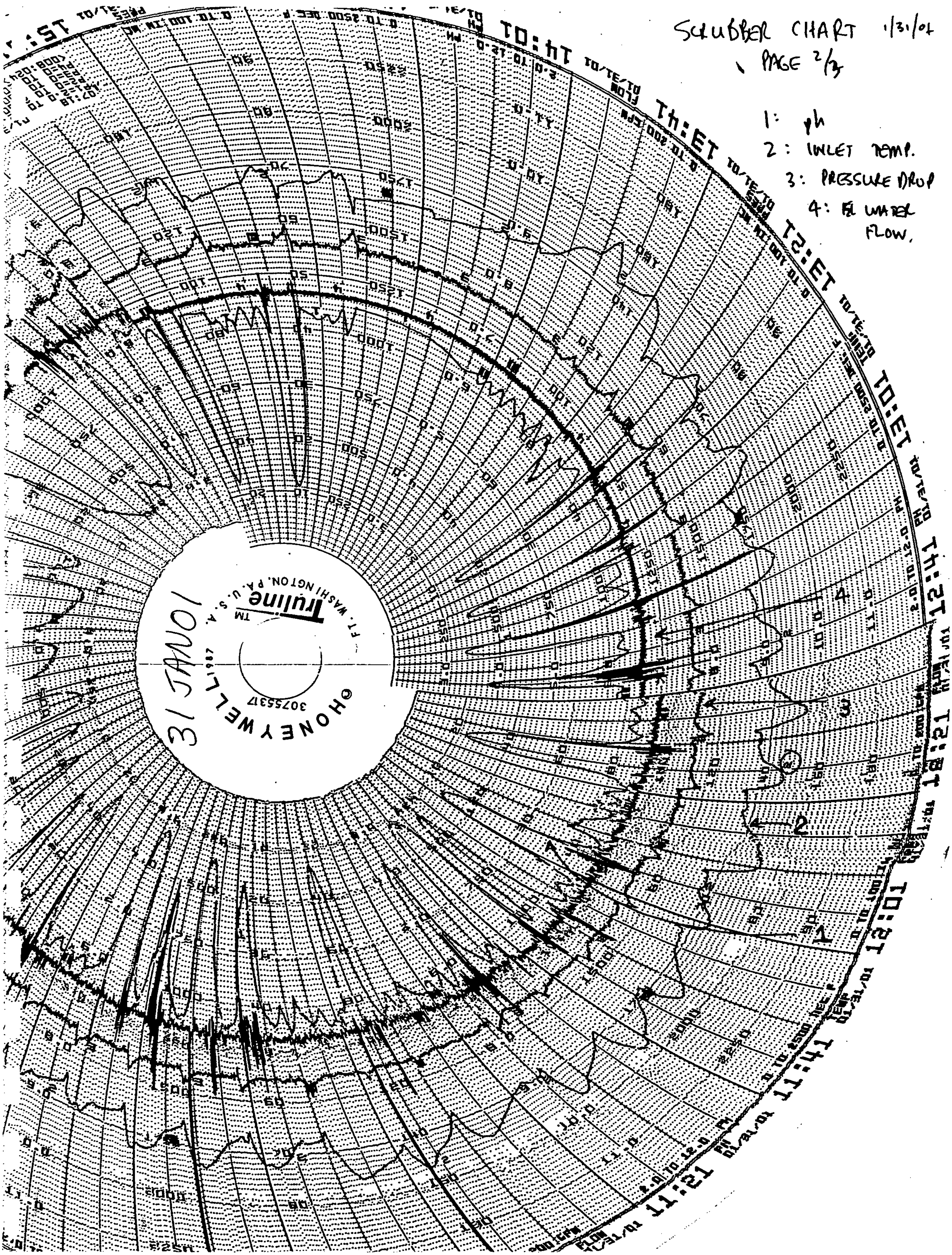
SCRUBBER 1/31/01
CHART
PG. 1/3




CHANNEL 1: pH
CHANNEL 2: INLET TEMP
CHANNEL 3: PRESSURE DROP
CHANNEL 4: WATER FLOW

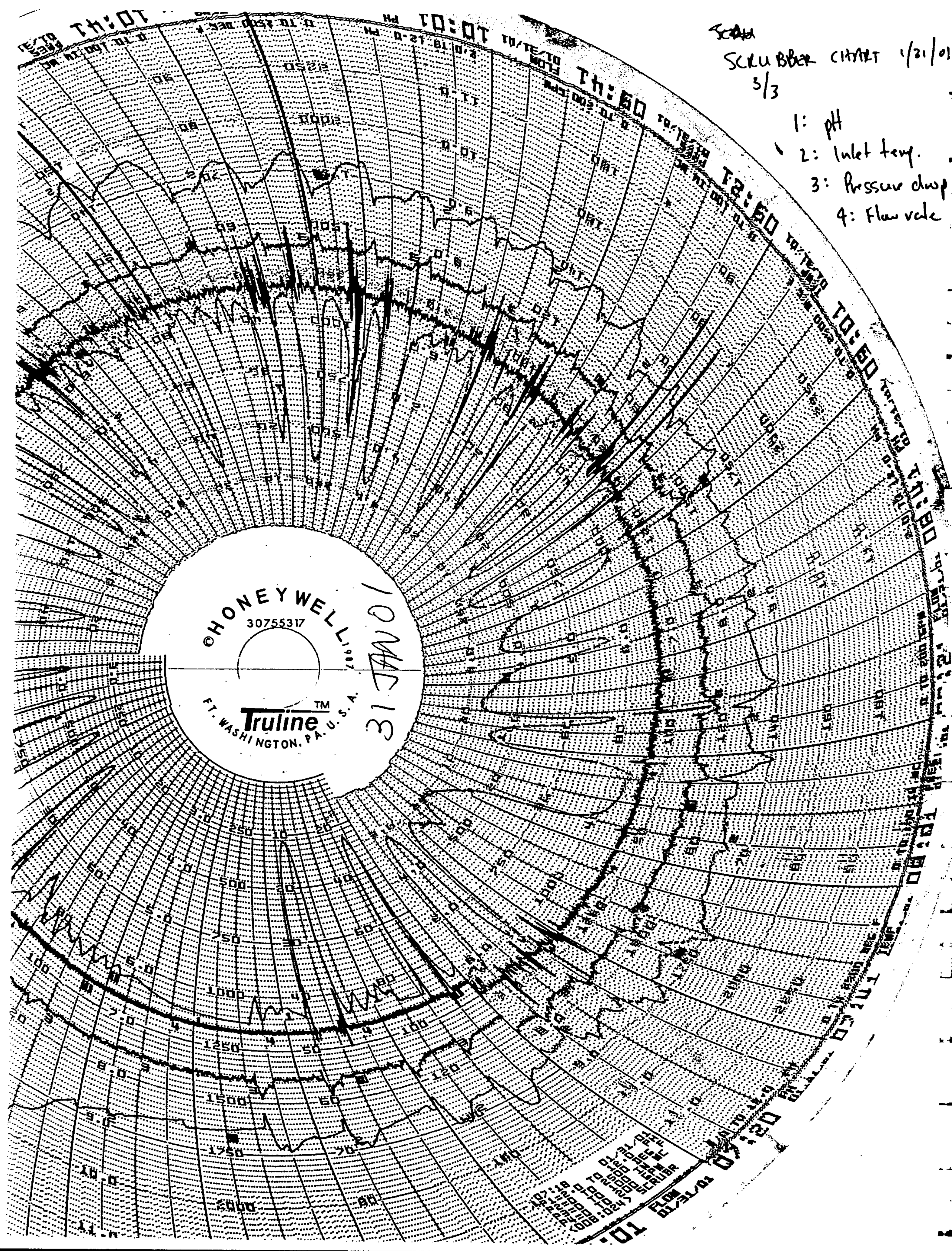
SCRUBBER CHART 1/31/01
PAGE 2/3

1: ph
2: INLET TEMP.
3: PRESSURE DROP
4: FL WATER FLOW.



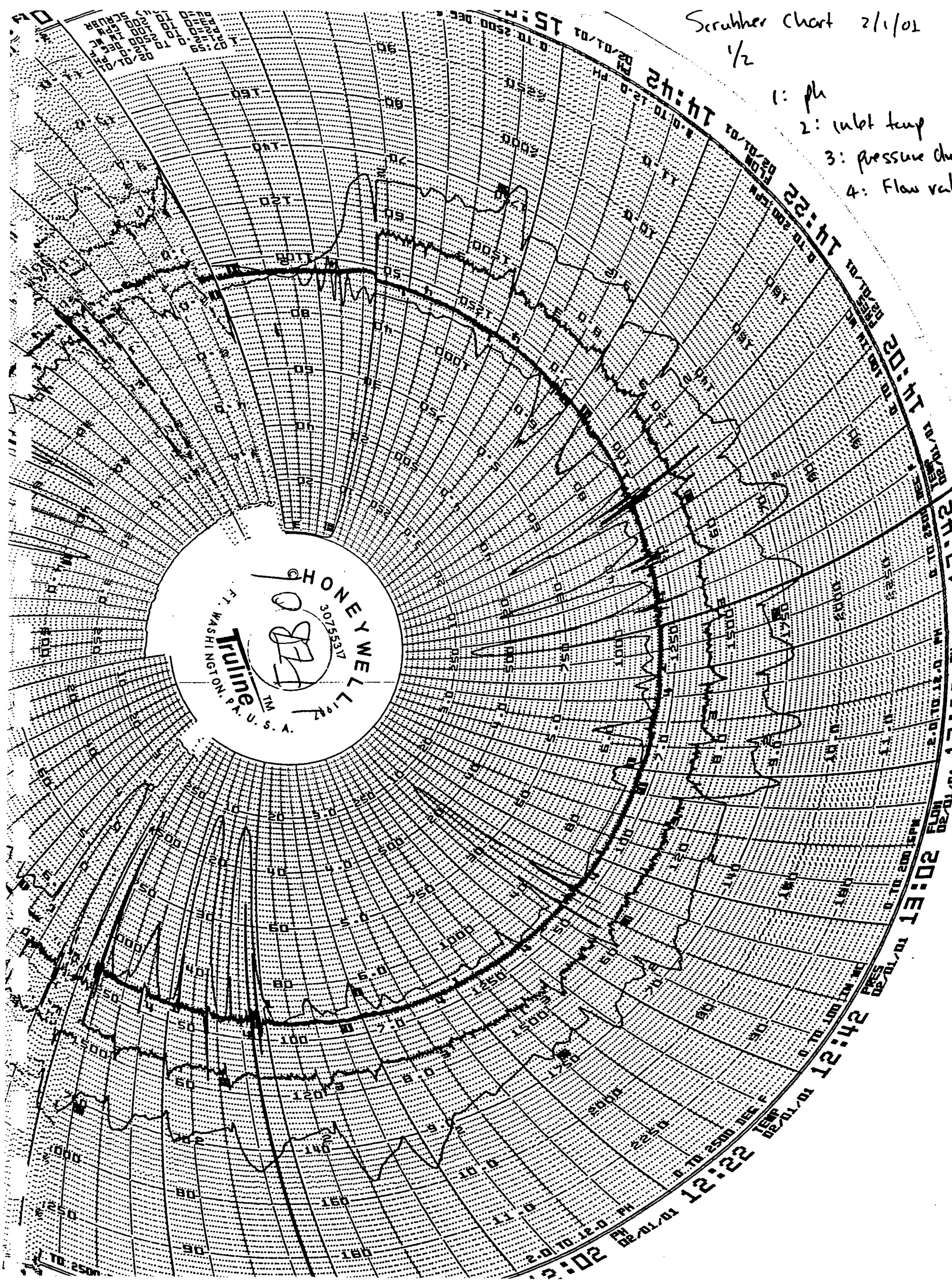
SCRUBBER CHART 1/31/01
3/3

1: pH
2: Inlet temp.
3: Pressure drop
4: Flow rate



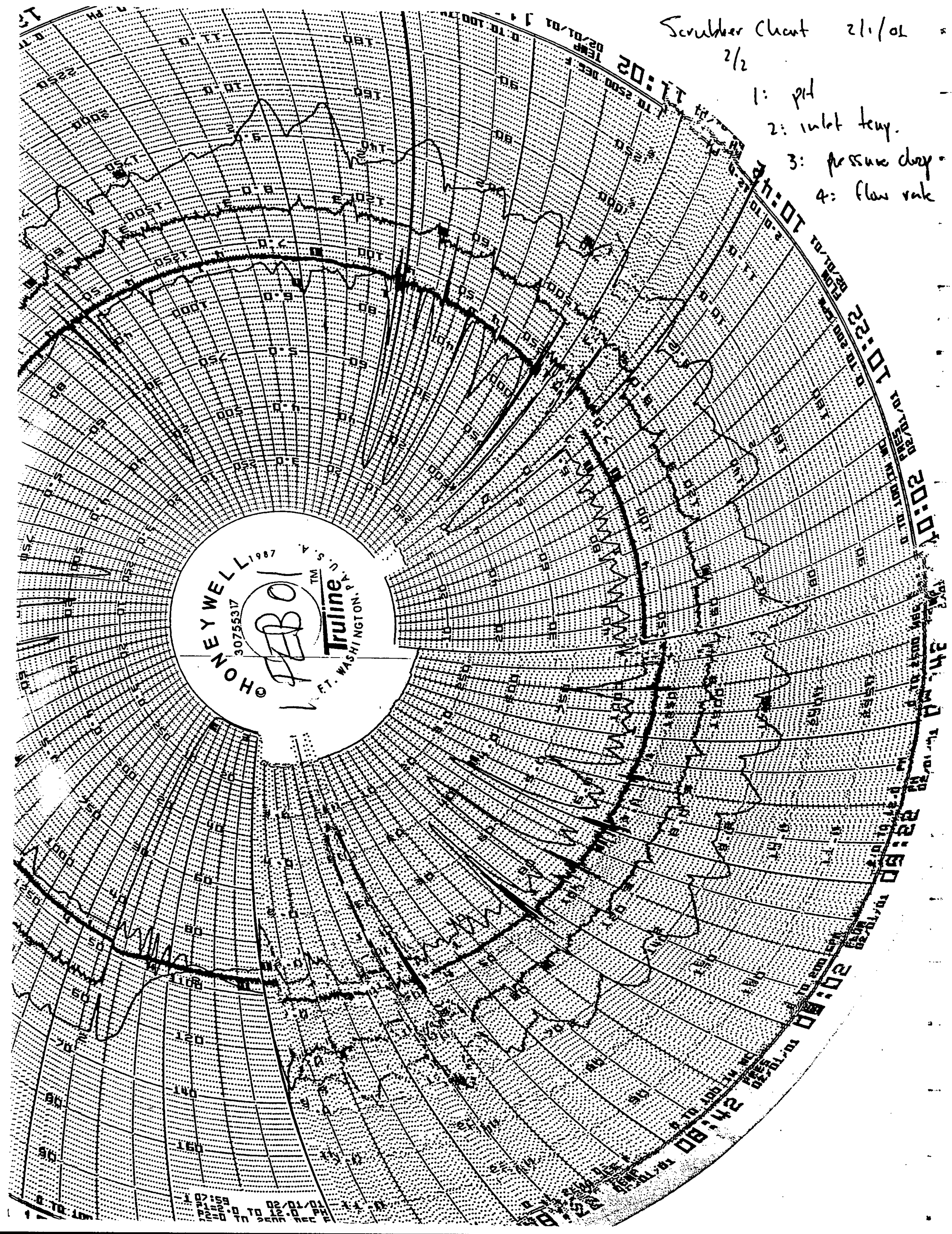
Scrubber Chart 2/1/01
1/2

1: ph
2: inlet temp
3: pressure drop
4: Flow rate



Scrubber Chart 2/1/01
2/2

1: pH
2: inlet temp.
3: pressure drop
4: flow rate



**PACIFIC ENVIRONMENTAL SERVICES, INC.**

| Project No. | Page | of |
|---|---|---|
| F181.001 | 1 | 3 |

| Client |
|---|
| AAFB |

| Location |
|---|
| AAFB |

| Prepared By | Date | Checked By | Date | Sheet Title |
|---|---|---|---|---|
| | | [illegible] | 2/2/01 | # 1 |

| Time | Scrubber Water pH |
|---|---|
| 9:50 | 6.3 |
| 9:55 | 5.8 |
| 10:00 | 6.5 |
| 10:05 | 6.5 |
| 10:10 | 6.6 |
| 10:15 | 6.5 |
| 10:20 | 6.6 |
| 10:25 | 6.0 |
| 10:30 | 3.3 |
| 10:35 | 6.2 |
| 10:40 | 6.6 |
| 10:45 | 6.6 |
| 10:50 | 6.2 |
| 11:00 | 6.5 |

**PACIFIC ENVIRONMENTAL SERVICES, INC.**

| Project No. | Page | of |
|---|---|---|
| F181.001 | 2 | 3 |

Client: AAFB

Location: AAFB

| Prepared By | Date | Checked By | Date | Sheet Title |
|---|---|---|---|---|
| | | CF | 2/2/01 | #2 |

| Time | ① PH (5) | ② Inlet temp (10) | ③ Pressure Drop (10) | ④ Flow rate (10 GPM) |
|---|---|---|---|---|
| 12:30 | 3.0 | 1706 | 56.9 | 93.3 |
| 12:35 | 3.2 | | | |
| 12:40 | 3.5 | 1650 | 58.8 | 93.8 |
| 12:45 | 2.8 | | | |
| 12:50 | 3.1 | 1724 | 57.0 | 92.6 |
| 12:55 | 3.0 | | | |
| 1:00 | 3.3 | 1701 | 57.3 | 93.0 |
| 1:05 | 3.0 | | | |
| 1:10 | 3.2 | 1650 | 56.9 | 93.0 |
| 1:15 | 3.2 | | | |
| 1:20 | 3.5 | 1713 | 55.4 | 93.1 |
| 1:25 | 6.4 | 1810 | 56.9 | 92.9 |
| 1:30 | 6.4 | 1759 | 56.4 | 92.7 |

PACIFIC ENVIRONMENTAL SERVICES, INC.

| Project No. | Page | of |
|---|---|---|
| F181.001 | 3 | 3 |

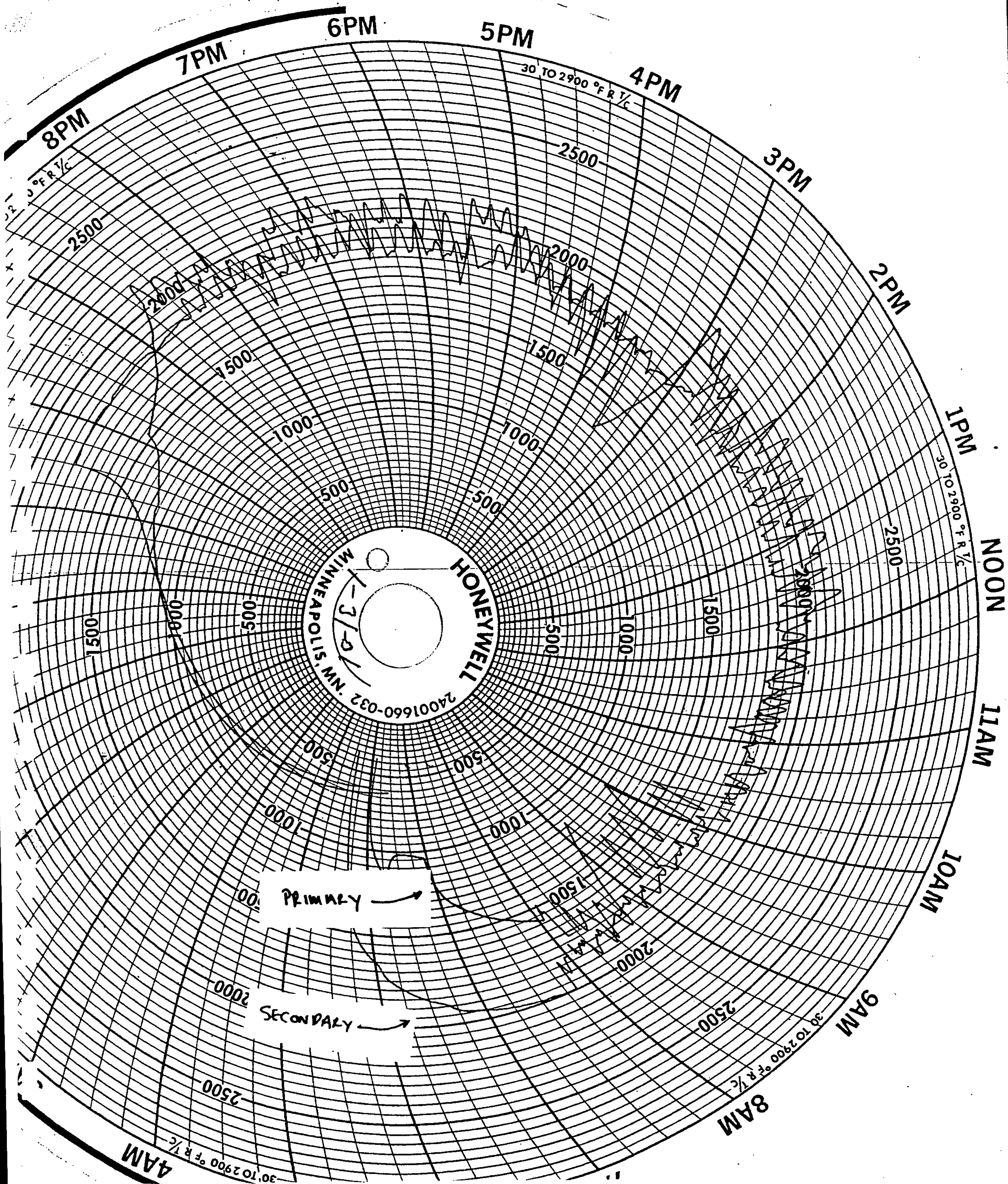
Client: AAFB

Location: AAFB

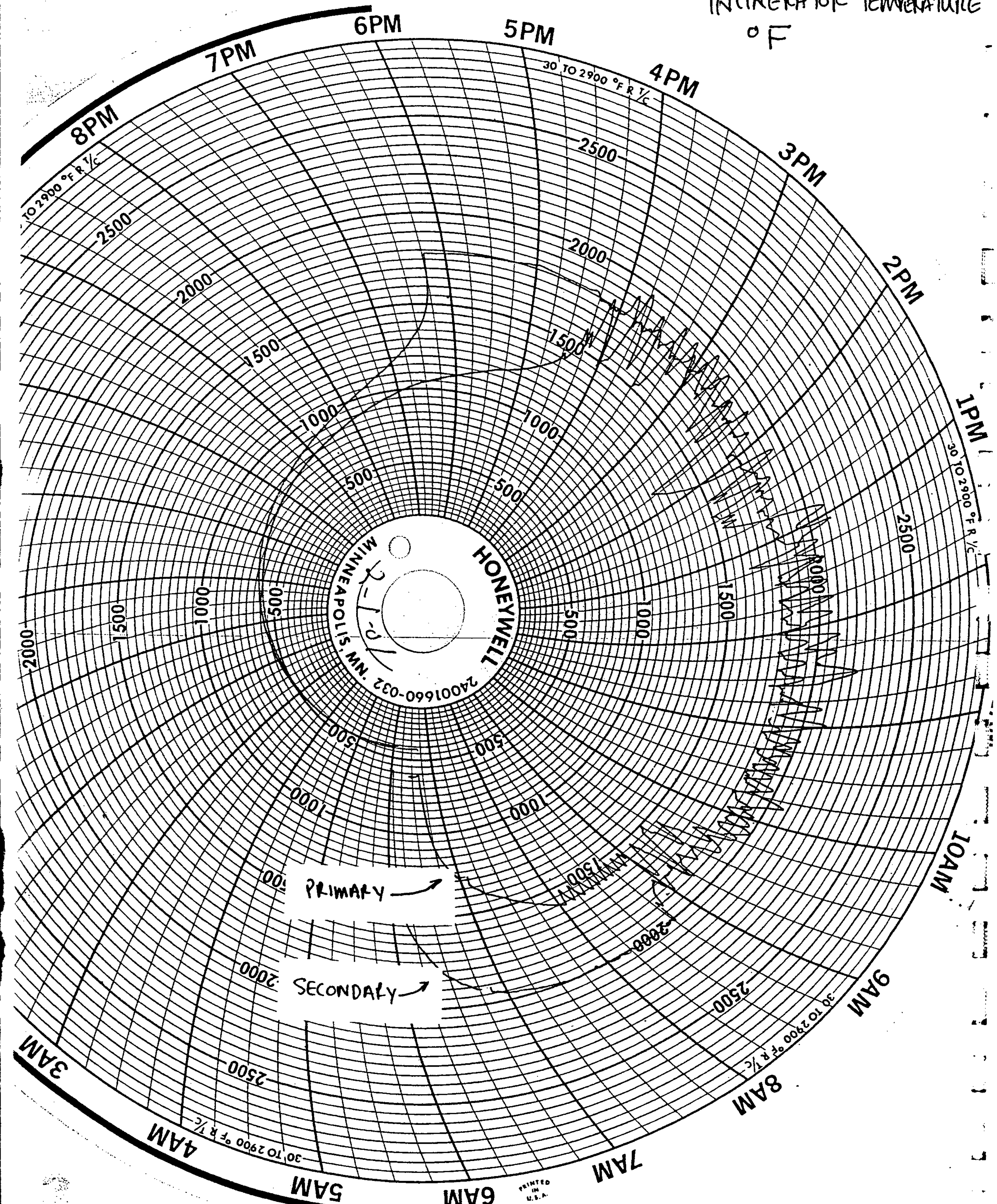
| Prepared By | Date | Checked By | Date | Sheet Title |
|---|---|---|---|---|
| | | W | 7/2/01 | #3 |

| Time | PH | inlet temp | Pressure Drop | Flow rate |
|---|---|---|---|---|
| 2:05 | 5.9 | 1715 | 55.9 | 92.6 |
| 2:10 | 4.3 | 1673 | 58.7 | 93.1 |
| 2:15 | 5.0 | 1773 | 56.1 | 91.2 |
| 2:20 | 6.6 | 1697 | 55.8 | 92.8 |
| 2:25 | 6.5 | 1675 | 55.3 | 92.7 |
| 2:30 | 6.5 | 1694 | 55.8 | 93.0 |
| 2:35 | 6.6 | 1678 | 55.5 | 92.7 |
| 2:40 | 5.7 | 1845 | 55.6 | 91.4 |
| 2:45 | 6.7 | 1697 | 55.6 | 93.3 |
| 2:50 | 6.6 | 1652 | 56.7 | 92.8 |
| 2:55 | 4.6 | 1812 | 55.1 | 96.9 |
| 3:00 | 6.7 | 1683 | 56.1 | 93.1 |
| 3:05 | 5.7 | 1834 | 55.4 | 92.9 |

INCINERATOR TEMPERATURE
°F

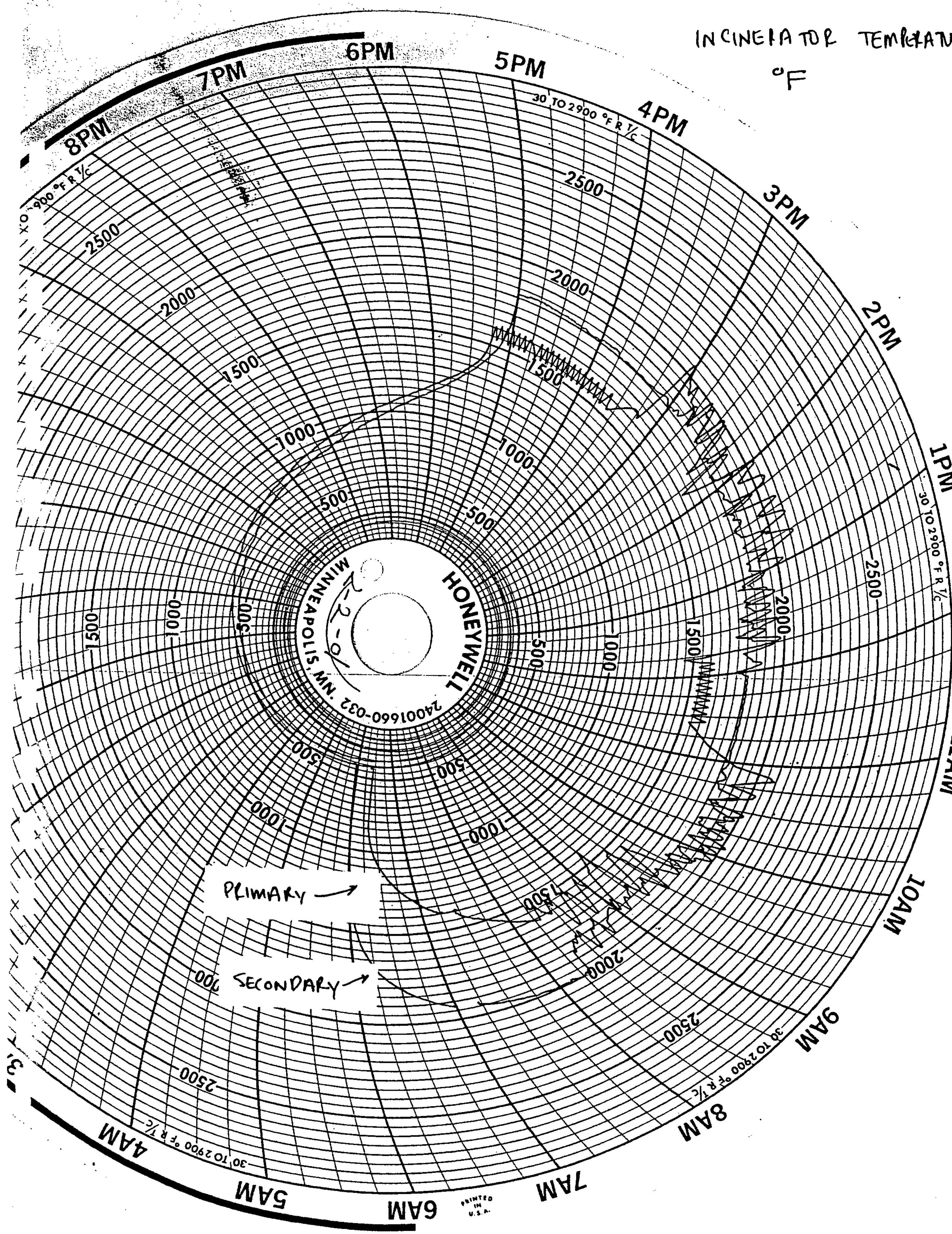


INCINERATOR TEMPERATURE
°F



INCINERATOR TEMPERATURE

°F



1-26-01 1:23 pm scrable Turn on

Did not begin on 1-29-01
set up for testing the stack

## INCINERATOR OPERATION

| OPERATOR | DATE | TIME | WEIGHT | PRIMARY | SECODNARY | BOXES |
|---|---|---|---|---|---|---|
| [illegible] | 1-26-01 | 1054 | 38 | 1504 | 1809 | 2 |
| [illegible] | 1-26-01 | 1110 | 42 | 1481 | 1777 | 2 |
| [illegible] | 1-26-01 | 1124 | 38 | 1619 | 1803 | 2 |
| [illegible] | 1-26-01 | 1135 | 40 | 1662 | 1797 | 2 |
| [illegible] | 1-26-01 | 1155 | 40 | 1695 | 1785 | 2 |
| [illegible] | 1-26-01 | 123 | 44 | 1406 | 1778 | 2 |
| [illegible] | 1-26-01 | 134 | 46 | 1500 | 1768 | 2 |
| [illegible] | 1-26-01 | 149 | 38 | 1163 | 1734 | 2 |
| [illegible] | 1-26-01 | 159 | 41 | 1444 | 1752 | 2 |
| [illegible] | 1-26-01 | 209 | 38 | 1625 | 1783 | 2 |
| [illegible] | 1-31-01 | 818 | 48 | 1451 | 1934 | 2 |
| [illegible] | 1-31-01 | 828 | 43 | 1455 | 1754 | 2 |
| [illegible] | 1-31-01 | 838 | 45 | 1532 | 1770 | 2 |
| [illegible] | 1-31-01 | 850 | 43 | 1547 | 1767 | 2 |
| [illegible] | 1-31-01 | 920 | 38 | 1058 | 1718 | 2 |
| [illegible] | 1-31-01 | 932 | 40 | 1275 | 1725 | 2 |
| [illegible] | 1-31-01 | 950 | 38 | 1215 | 1726 | 2 |
| | | | 700 | | | 30 |

# APPENDIX B
# RAW FIELD DATA

# Appendix B.1
# Raw Field Data
# Particulate Matter/Metals (M29)

PES

# TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: Andrews AFB

Date: 01-31-01

Sampling Location: stack

Inside of Far Wall to Outside of Nipple: 17 3/8"

Inside of Near Wall to Outside of Nipple (Nipple Length): 2"

Stack I.D.: 15 3/8

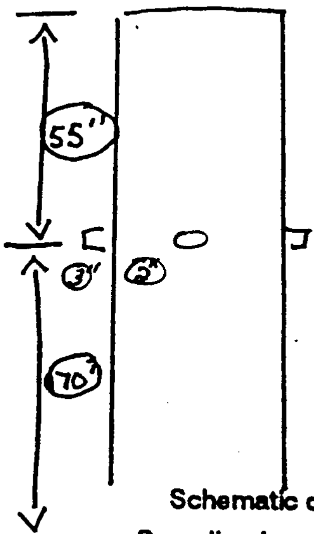
Distance Downstream from Flow Disturbance (Distance B):

170" inches / Stack I.D. = 11.05 dd

Distance Upstream from Flow Disturbance (Distance A):

55" inches / Stack I.D. = 3.58 dd

Calculated By: Dennis D. Holzschuh




Schematic of Sampling Location

| Traverse Point Number | Fraction of Length | Length (inches) | Product of Columns 2 & 3 (To nearest 1/8") | Nipple Length (inches) | Traverse Point Location (Sum of Col. 4 & 5) |
|---|---|---|---|---|---|
| A 1 | .044 | 15 3/8" | 5/8" | 2 | A 2 5/8" B 3 5/8" |
| 2 | .146 | 15 3/8" | 2 1/4" | 2 | 4 1/4" 5 1/4" |
| 3 | .296 | 15 3/8" | 4 1/2" | 2 | 6 1/2" 7 1/2" |
| 4 | .704 | 15 3/8" | 10 7/8" | 2 | 12 7/8" 13 7/8" |
| 5 | .854 | 15 3/8" | 13 1/8" | 2 | 15 1/8" 16 1/8" |
| 6 | .956 | 15 3/8" | 14 3/4" | 2 | 16 3/4" 17 3/4" |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# YAW ANGLE CHECK (EPA Method 1) & GAS VELOCITY (EPA Method 2)

Facility: Andrews Air Force Base

Project No.: F181-001

Sampling Location: Stack

Date: ~~0815~~ 01/31/01

Run # M2-1

Clock Time: 0815-0830

Barometric Pressure, (in. Hg): 29.9

Operators: DDH

Moisture, (%): ~ 3.5 %

Static Pressure, in $H_2O$: + .15

Dry Molecular weight, (g/g-mol):

Pitot Tube, Cp: .84

Stack Diameter or Side 1 Dimension, (in.): 15 3/8"

Side 2: ——

| Traverse Point No. | Yaw Angle (°) | Velocity Head In. $H_2O$ | Stack Temp (°F) |
|---|---|---|---|
| A 1 | 0 | .35 | 170 |
| 2 | 0 | .26 | 170 |
| 3 | 0 | .32 | 170 |
| 4 | 0 | .43 | 170 |
| 5 | 0 | .44 | 170 |
| 6 | 0 | .45 | 171 |
| B 1 | 0 | .35 | 170 |
| 2 | 0 | .42 | 170 |
| 3 | 0 | .44 | 170 |
| 4 | 0 | .49 | 170 |
| 5 | 0 | .48 | 170 |
| 6 | 0 | .42 | 170 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M29-1 Date: 02-02-01
Pretest Leak Rate: .001 cfm @ 15 in. Hg.
Pretest Leak Check: Pilot: ✓ Orsat: N/A

Sample Type: M29 Operator: DDH
Pbar: 29.9 Ps: +.15
CO2: 5 O2: 12
Probe Length/Type: 3'-Glass Pitot #: PP-19
Stack Diameter: 15 3/8" As: 185.78
K=5.00

Nozzle ID: .310 Thermocouple #: RT-6
Assumed Bws: ~32 Filter #: 104-007
Meter Box #: AMB-15 Y: 0.995 ΔH@: 1.80
Post-Test Leak Rate: 0.001 cfm @ 15 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: N/A

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hour clock) | Gas Meter Reading (Vm) $ft^3$ | Velocity Head ($\Delta p$) in H2O | Orifice Pressure Differential ($\Delta H$) in H2O Desired | Orifice Pressure Differential ($\Delta H$) in H2O Actual | Stack Temp. (Ts) | Temperature °F Probe | Temperature °F Filter | Impinger Temp. °F | Dry Gas Meter Temp. Inlet (Tm in °F) | Dry Gas Meter Temp. Outlet (Tm out °F) | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A 1 | 0 | 0945 | 805.550 | | | | | | | | | | |
| 2 | 5 | 0950 | 809.102 | .34 | 1.70 | 1.70 | 172 | 251 | 252 | 48 | 100 | 101 | 3 |
| 3 | 10 | 0955 | 813.469 | .35 | 1.75 | 1.75 | 172 | 252 | 251 | 48 | 100 | 101 | 3 |
| 4 | 15 | 1000 | 817.210 | .34 | 1.70 | 1.70 | 172 | 253 | 251 | 48 | 100 | 100 | 3 |
| 5 | 20 | 1005 | 820.905 | .35 | 1.75 | 1.75 | 171 | 252 | 251 | 49 | 101 | 101 | 3 |
| 6 | 25 | 1010 | 824.606 | .35 | 1.75 | 1.75 | 172 | 252 | 251 | 49 | 102 | 101 | 3 |
| B 1 | 30/0 | 1015 | 828.210 | .36 | 1.80 | 1.80 | 171 | 251 | 251 | 49 | 102 | 101 | 3 |
| 2 | 35 | 1025 | 831.840 | .35 | 1.75 | 1.75 | 171 | 252 | 252 | 49 | 102 | 102 | 3 |
| 3 | 40 | 1030 | 835.530 | .32 | 1.60 | 1.60 | 171 | 251 | 251 | 48 | 102 | 102 | 3 |
| 4 | 45 | 1035 | 838.905 | .32 | 1.60 | 1.60 | 172 | 252 | 251 | 49 | 103 | 103 | 3 |
| 5 | 50 | 1040 | 842.610 | .34 | 1.70 | 1.70 | 171 | 253 | 251 | 49 | 103 | 102 | 3 |
| 6 | 55 | 1045 | 845.812 | .34 | 1.70 | 1.70 | 171 | 251 | 250 | 46 | 103 | 103 | 3 |
| | 60 | 1050 | 849.400 | .34 | 1.70 | 1.70 | 171 | 251 | 250 | 46 | 103 | 102 | 3 |

$\Delta Vm$= $\overline{\sqrt{\Delta p}}$= $\overline{\Delta H}$= $\overline{Ts}$= $\overline{Tm}$=

# MULTI-METALS SAMPLE RECOVERY DATA

| | | |
|---|---|---|
| Plant: Andrews AFB MD | | Run No.: M29-1 |
| Date: 02/07/01 | Sample Box No.: | Job No.: F161-001 |
| Sample Location: Incinerator Outlet | | |
| Sample Type: M29 | | |
| Sample Recovery Person: MDM | | |

| Container | Description | Volume, ml | Sealed/Level Marked |
|---|---|---|---|
| **Front Half** | | | |
| 1 | Filter No.(s) 164.007 | | |
| 2 | Acetone Rinse | | |
| 3 | Nitric Rinse | | |
| **Back Half** | | | |
| 4 | Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter | | |
| 5A | Nitric Rinse - Impinger No. 4 | | |
| 5B | KMNO4/H2O Rinse - Impingers 5 & 6 | | |
| 5C | HCl Rinse - Impingers 5 & 6 | | |

**Moisture Data**

| Impinger No. | Contents | Initial Volume, ml | Weight, grams Initial | Final | Net |
|---|---|---|---|---|---|
| 1 | K.O. | 0 | 616.8 | 828.1 | 211.3 |
| 2 | HNO3 | 100 | 751.1 | 855.0 | 103.9 |
| 3 | HNO3 | 100 | 634.1 | 658.1 | 24.0 |
| 4 | MT | 0 | 629.6 | 633.2 | 3.6 |
| 5 | KMnO4 | 100 | 728.5 | 730.8 | 2.3 |
| 6 | KMnO4 | 100 | 721.1 | 721.9 | 0.8 |
| 7 | Si Gel | - | 913.1 | 922.1 | 9 |
| | | | | | |
| | | | | | |
| | | | | | |
| Total | | | | | 354.9 |

Comments:

# FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M29-2 Date: 02-02-01
Pretest Leak Rate: 0.002 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ +3" Orsat: N/A

Sample Type: M29 Operator: DDH
Pbar: 29.90 Ps: + .14
CO2: 5 O2: 12
Probe Length/Type: 3'-Glass Pitot #: RP-19
Stack Diameter: $13\frac{3}{8}$" As: 185.78
K = 5.0

Nozzle ID: .310 Thermocouple #: RT-6
Assumed Bws: 52 Filter #: 104-003
Meter Box #: RMB-15 Y: .995 ΔH@: 1.80
Post-Test Leak Rate: 0.001 cfm @ 15 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: N/A

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hour clock) | Gas Meter Reading (Vm) ft³ | Velocity Head (Δp) in H2O | Orifice Pressure Differential (ΔH) in H2O Desired | Orifice Pressure Differential (ΔH) in H2O Actual | Stack Temp. (Ts) | Temperature °F Probe | Temperature °F Filter | Impinger Temp. °F | Dry Gas Meter Temp. Inlet (Tm in °F) | Dry Gas Meter Temp. Outlet (Tm out °F) | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A 1 | 0 | 1230 | 849.500 | | | | | | | | | | |
| 2 | 5 | 1235 | 852.210 | .34 | 1.70 | 1.70 | 172 | 252 | 251 | 49 | 104 | 104 | 2 |
| 3 | 10 | 1240 | 855.900 | .35 | 1.75 | 1.75 | 172 | 253 | 251 | 50 | 104 | 103 | 2 |
| 4 | 15 | 1245 | 859.480 | .35 | 1.75 | 1.75 | 171 | 252 | 251 | 50 | 104 | 104 | 2 |
| 5 | 20 | 1250 | 863.090 | .33 | 1.65 | 1.65 | 172 | 253 | 251 | 50 | 104 | 103 | 2 |
| 6 | 25 | 1255 | 866.615 | .36 | 1.80 | 1.80 | 172 | 252 | 251 | 50 | 104 | 102 | 2 |
| B 1 | 30/0 | 1300 | 870.200 | .36 | 1.80 | 1.80 | 172 | 252 | 251 | 51 | 104 | 103 | 2 |
| 2 | 35 | 1310 | 873.961 | .35 | 1.75 | 1.75 | 171 | 252 | 252 | 52 | 104 | 104 | 2 |
| 3 | 40 | 1315 | 877.300 | .35 | 1.75 | 1.75 | 171 | 252 | 251 | 51 | 104 | 104 | 2 |
| 4 | 45 | 1320 | 880.750 | .28 | 1.40 | 1.40 | 171 | 252 | 251 | 52 | 104 | 102 | 2 |
| 5 | 50 | 1325 | 884.010 | .28 | 1.40 | 1.40 | 172 | 253 | 250 | 52 | 104 | 102 | 2 |
| 6 | 55 | 1330 | 887.720 | .34 | 1.70 | 1.70 | 172 | 252 | 251 | 50 | 104 | 103 | 2 |
| | 60 | 1335 | 891.530 | .37 | 1.85 | 1.85 | 172 | 251 | 250 | 50 | 103 | 102 | 2 |

ΔVm= ______ $\overline{\sqrt{\Delta p}}$= ______ $\overline{\Delta H}$= ______ $\overline{Ts}$= ______ $\overline{Tm}$= ______

# MULTI-METALS SAMPLE RECOVERY DATA

PACIFIC ENVIRONMENTAL SERVICES, INC.

| | | |
|---|---|---|
| Plant: Andrews AFB MD | | Run No.: M29-2 |
| Date: 02/02/04 | Sample Box No.: | Job No.: F181.002 |
| Sample Location: Incinerator Outlet | | |
| Sample Type: Method 29 | | |
| Sample Recovery Person: MVM | | |

| Container | Description | Volume, ml | Sealed/Level Marked |
|---|---|---|---|
| **Front Half** | | | |
| 1 | Filter No.(s) 104-003 | | |
| 2 | Acetone Rinse | | |
| 3 | Nitric Rinse | | |
| **Back Half** | | | |
| 4 | Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter | | |
| 5A | Nitric Rinse - Impinger No. 4 | | |
| 5B | KMNO4/H2O Rinse - Impingers 5 & 6 | | |
| 5C | HCl Rinse - Impingers 5 & 6 | | |

**Moisture Data**

| Impinger No. | Contents | Initial Volume, ml | Weight, grams Initial | Final | Net |
|---|---|---|---|---|---|
| 1 | KO | 0 | 643.2 | 776.5 | 133.3 |
| 2 | HNO3 | 100 | ~~621.0~~ 713.0 | 828.6 | 115.6 |
| 3 | HNO3 | 100 | 759.5 | 816.7 | 57.2 |
| 4 | MT | 0 | 523.8 | 536.1 | 12.3 |
| 5 | KMnO4 | 100 | 760.6 | 768.7 | 8.1 |
| 6 | KMnO4 | 100 | 732.8 | 734.1 | 1.3 |
| 7 | Sgel | - | 1016.6 | 1027.9 | 11.3 |
| | | | | | |
| | | | | | |
| | | | | | |
| Total | | | | | 339.1 |

Comments:

# FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M29-3 Date: 02-02-01
Pretest Leak Rate: .002 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M29 Operator: DDH
Pbar: 29.4 Ps: +.15
CO2: 5 O2: 12
Probe Length/Type: 80-19 Pitot #: 3' Glass
Stack Diameter: 15 3/8" As: 1.85
K=5.000

Nozzle ID: .310 Thermocouple #: RT-6
Assumed Bws: 28 Filter #: 104-005
Meter Box #: RMB-15 Y: .995 ΔH@: 1.85
Post-Test Leak Rate: .004 cfm @ 15 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: N/A

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hour clock) | Gas Meter Reading (Vm) ft³ | Velocity Head (Δp) in H2O | Orifice Pressure Differential (ΔH) in H2O Desired | Orifice Pressure Differential (ΔH) in H2O Actual | Stack Temp. (Ts) | Temperature °F Probe | Temperature °F Filter | Impinger Temp. °F | Dry Gas Meter Temp. Inlet (Tm in °F) | Dry Gas Meter Temp. Outlet (Tm out °F) | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A 1 | 0 | 1405 | 891.600 | | | | | | | | | | |
| 2 | 5 | 1410 | 894.800 | .30 | 1.50 | 1.50 | 170 | 250 | 251 | 48 | 101 | 101 | 2 |
| 3 | 10 | 1415 | 899.150 | .36 | 1.80 | 1.80 | 171 | 252 | 252 | 49 | 102 | 102 | 2 |
| 4 | 15 | 1420 | 903.860 | .35 | 1.75 | 1.75 | 172 | 253 | 250 | 49 | 103 | 102 | 3 |
| 5 | 20 | 1425 | 907.640 | .35 | 1.75 | 1.75 | 172 | 252 | 251 | 49 | 103 | 102 | 3 |
| 6 | 25 | 1430 | 911.305 | .34 | 1.70 | 1.70 | 171 | 251 | 251 | 49 | 104 | 102 | 3 |
| B 1 | 30/0 | 1435 | 915.160 | .34 | 1.70 | 1.70 | 171 | 252 | 250 | 49 | 104 | 102 | 3 |
| 2 | 35 | 1445 | 918.650 | .35 | 1.75 | 1.75 | 172 | 253 | 251 | 51 | 104 | 103 | 3 |
| 3 | 40 | 1450 | 922.322 | .35 | 1.75 | 1.75 | 171 | 252 | 250 | 52 | 103 | 103 | 3 |
| 4 | 45 | 1455 | 926.817 | .38 | 1.90 | 1.90 | 172 | 254 | 251 | 51 | 103 | 102 | 3 |
| 5 | 50 | 1500 | 929.991 | .37 | 1.85 | 1.85 | 172 | 253 | 252 | 52 | 104 | 103 | 3 |
| 6 | 55 | 1505 | 934.020 | .34 | 1.70 | 1.70 | 172 | 252 | 251 | 51 | 104 | 103 | 3 |
| | 60 | 1510 | 938.050 | .34 | 1.70 | 1.70 | 172 | 251 | 251 | 52 | 104 | 104 | 3 |

ΔVm= ______ $\overline{\sqrt{\Delta p}}$= ______ $\overline{\Delta H}$= ______ $\overline{Ts}$= ______ $\overline{Tm}$= ______

# MULTI-METALS SAMPLE RECOVERY DATA

PACIFIC ENVIRONMENTAL SERVICES, INC.

| | | |
|---|---|---|
| Plant: Andrews AFB | | Run No.: M29-3 |
| Date: | Sample Box No.: | Job No.: |
| Sample Location: | | |
| Sample Type: | | |
| Sample Recovery Person: | | |

| Container | Description | Volume, ml | Sealed/Level Marked |
|---|---|---|---|
| **Front Half** | | | |
| 1 | Filter No.(s) 104-005 | | |
| 2 | Acetone Rinse | | |
| 3 | Nitric Rinse | | |
| **Back Half** | | | |
| 4 | Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter | | |
| 5A | Nitric Rinse - Impinger No. 4 | | |
| 5B | KMNO4/H2O Rinse - Impingers 5 & 6 | | |
| 5C | HCl Rinse - Impingers 5 & 6 | | |

**Moisture Data**

| Impinger No. | Contents | Initial Volume, ml | Weight, grams Initial | Final | Net |
|---|---|---|---|---|---|
| 1 | K.O. | 0 | 619.4 | 723.0 | 103.6 |
| 2 | HNO3 | 100 | 747.2 | 858.4 | 111.2 |
| 3 | HNO3 | 100 | 638.0 | 712.9 | 74.9 |
| 4 | K.O. | 0 | 630.7 | 651.6 | 20.9 |
| 5 | KMnO4 | 100 | 729.5 | 748.1 | 18.6 |
| 6 | KMnO4 | 100 | 719.1 | 725.4 | 6.3 |
| 7 | Si Gel | - | 922.0 | 942.9 | 20.9 |
| | | | | | |
| | | | | | |
| | | | | | |
| Total | | | | | 356.4 |

Comments:

**Appendix B.2**

**Raw Field Data**

**Dioxins/Furans (M23)**

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: stack
Run Number: M23-1 Date: 01/31/01
Pretest Leak Rate: 0.010 cfm @ 15" in. Hg
Pretest Leak Check: Pitot: ✓ +3" Orsat: N/A

Sample Type: M23 Operator(s): DSH
$P_{bar}$: 29.90 $P_s$: +.15
$CO_2$: 5 $O_2$: 12.0
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8" $A_s$: 185.78
K ~~4.343~~
K ~~4.186~~ (R) 4.745

Nozzle ID: XXIV-.310 Thermocouple No.: RTC
Assumed $B_{ws}$: ~3.5% Filter No.: DF
Meter Box No.: RMB-15 γ: .995 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15" in. Hg
Posttest Leak Check Rate: Pitot: N/A Orsat: ✓

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hr) | Gas Meter Reading ($V_m$, $ft^3$) | Velocity Head ($\Delta P$, in $H_2O$) | Orifice Pressure Differential ($\Delta H$, in $H_2O$) Desired | Actual | Stack Temp (°F) | Probe Temp (°F) | Filter Temp (°F) | Impinger Temp (°F) | XAD Temp (°F) | Dry Gas Meter Temperature (°F) Inlet | Outlet | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 0 | 1026 | 232.290 | | | | | | | | | | | |
| | 5 | 1031 | 235.850 | .34 | 1.43 | 1.43 | 170 | 250 | 250 | 48 | 48 | 87 | 87 | 3 |
| | 10 | 1036 | 239.264 | .35 | 1.47 | 1.47 | 170 | 247 | 251 | 49 | 48 | 88 | 88 | 3 |
| | 15 | 1041 | 242.564 | .34 | 1.43 | 1.43 | 170 | 248 | 252 | 49 | 49 | 88 | 88 | 3 |
| 2 | 20/0 | 1046 | 246.123 | .35 | 1.47 | 1.47 | 170 | 249 | 251 | 49 | 49 | 88 | 88 | 3 |
| | 25 | 1051 | 249.564 | .35 | 1.47 | 1.47 | 170 | 249 | 252 | 50 | 51 | 88 | 88 | 3 |
| | 30 | 1056 | 252.010 | .36 | 1.51 | 1.51 | 170 | 251 | 252 | 50 | 51 | 88 | 88 | 3 |
| | 35 | 1101 | 255.560 | .36 | 1.51 | 1.51 | 170 | 251 | 252 | 51 | 51 | 88 | 88 | 3 |
| 3 | 40/0 | 1106 | 258.900 | .39 | 1.64 | 1.64 | 170 | 252 | 250 | 48 | 48 | 88 | 88 | 3 |
| | 45 | 1111 | 261.815 | .32 | 1.34 | 1.34 | 171 | 251 | 251 | 49 | 49 | 88 | 88 | 3 |
| | 50 | 1116 | 265.200 | .35 | 1.47 | 1.47 | 171 | 252 | 251 | 49 | 49 | 88 | 88 | 3 |
| | 55 | 1121 | 268.650 | .36 | 1.51 | 1.51 | 171 | 252 | 251 | 49 | 52 | 88 | 89 | 3 |
| 4 | 60/0 | 1126 | 272.000 | .36 | 1.51 | 1.61 | 171 | 252 | 254 | 51 | 51 | 88 | 88 | 3 |
| | 65 | 1131 | 275.342 | .36 | 1.51 | 1.51 | 171 | 252 | 251 | 52 | 51 | 88 | 89 | 3 |
| | 70 | 1136 | 278.900 | .38 | 1.55 | 1.51 | 171 | 251 | 253 | 51 | 51 | 88 | 89 | 3 |
| | 75 | 1141 | 282.400 | .37 | 1.55 | 1.55 | 171 | 252 | 254 | 51 | 50 | 88 | 88 | 3 |
| 5 | 80 | 1146 | 286.000 | .36 | 1.51 | 1.51 | 171 | 252 | 253 | 51 | 51 | 88 | 89 | 3 |
| | 85 | 1151 | 290.643 | .36 | 1.51 | 1.51 | 171 | 253 | 251 | 51 | 51 | 88 | 89 | 3 |
| | 90 | 1156 | 294.000 | .36 | 1.72 | 1.72 | 171 | 253 | 251 | 51 | 51 | 88 | 89 | 3 |
| | 95 | 1201 | 298.000 | .36 | 1.72 | 1.72 | 171 | 253 | 251 | 51 | 51 | 88 | 89 | 3 |
| 6 | 100 | 1206 | 301.165 | .36 | 1.63 | 1.63 | 171 | 252 | 251 | 52 | 52 | 88 | 88 | 3 |
| | 105 | 1211 | 305.675 | .34 | 1.54 | 1.54 | 171 | 252 | 252 | 51 | 51 | 88 | 88 | 3 |
| | 110 | 1216 | 309.000 | .33 | 1.49 | 1.49 | 172 | 251 | 251 | 51 | 52 | 88 | 88 | 3 |

$\Delta V_m$:______ $\Delta p$:______ $\Delta H$:______ $T_s$:______ $T_m$:______

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-1 Date: 01/31/01
Pretest Leak Rate: 0.010 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ +3'' Orsat: NA

Sample Type: M23 Operator(s): DDH
$P_{bar}$: 29.9 $P_s$: +.15
$CO_2$: 5% $O_2$: 12%
Probe Length/Type: 5'/Glass Pitot #: RP-19
Stack Diameter: 15 3/8'' $A_s$: 185.78

Nozzle ID: XXIV .310 Thermocouple No.: RT6
Assumed $B_{ws}$: ~3% Filter No.: DF
Meter Box No.: RMB-5Y: 0.995 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ +3'' Orsat: NA

4.245

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hr) | Gas Meter Reading ($V_m$, $ft^3$) | Velocity Head (ΔP, in $H_2O$) | Orifice Pressure Differential (ΔH, in $H_2O$) Desired | Actual | Stack Temp (°F) | Probe Temp (°F) | Filter Temp (°F) | Impinger Temp (°F) | XAD Temp (°F) | Dry Gas Meter Temperature (°F) Inlet | Outlet | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 115 | 1221 | 313.043 | .40 | 1.81 | 1.81 | 180 | 251 | 254 | 50 | 50 | 88 | 88 | 7 |
| B 1 | 120 | 1226 | 319.480 | .31 | 1.48 | 1.48 | 171 | 252 | 253 | 51 | 50 | 88 | 88 | 7 |
| | 125 | 1255 | 322.720 | .31 | 1.41 | 1.41 | 171 | 252 | 254 | 52 | 50 | 90 | 88 | 7 |
| | 130 | 1300 | 326.342 | .32 | 1.45 | 1.45 | 173 | 251 | 251 | 51 | 50 | 91 | 90 | 7 |
| | 135 | 1305 | 329.545 | .36 | 1.64 | 1.64 | 172 | 253 | 250 | 52 | 51 | 90 | 90 | 7 |
| 2 | 140 | 1310 | 333.430 | .39 | 1.77 | 1.77 | 171 | 253 | 254 | 52 | 51 | 90 | 90 | 7 |
| | 145 | 1315 | 337.453 | .40 | 1.82 | 1.82 | 172 | 253 | 250 | 52 | 52 | 91 | 90 | 7 |
| | 150 | 1320 | 340.980 | .40 | 1.82 | 1.82 | 172 | 254 | 251 | 52 | 52 | 91 | 91 | 7 |
| | 155 | 1325 | 343.953 | .32 | 1.45 | 1.45 | 173 | 254 | 254 | 51 | 51 | 90 | 90 | 7 |
| 3 | 160 | 1330 | 347.341 | .35 | 1.59 | 1.59 | 173 | 254 | 254 | 51 | 52 | 91 | 91 | 7 |
| | 165 | 1335 | 351.078 | .35 | 1.59 | 1.59 | 173 | 252 | 251 | 52 | 52 | 92 | 91 | 7 |
| | 170 | 1340 | 354.456 | .36 | 1.64 | 1.64 | 172 | 253 | 250 | 53 | 52 | 92 | 92 | 7 |
| | 175 | 1345 | 357.986 | .35 | 1.59 | 1.59 | 172 | 253 | 251 | 53 | 53 | 93 | 92 | 7 |
| 4 | 180 | 1350 | 361.300 | .35 | 1.59 | 1.59 | 172 | 252 | 251 | 52 | 52 | 93 | 92 | 7 |
| | 185 | 1355 | 364.900 | .34 | 1.55 | 1.55 | 172 | 252 | 251 | 51 | 51 | 93 | 92 | 7 |
| | 190 | 1400 | 368.240 | .34 | 1.56 | 1.56 | 171 | 253 | 252 | 52 | 52 | 93 | 93 | 7 |
| | 195 | 1405 | 372.042 | .35 | 1.60 | 1.60 | 171 | 252 | 251 | 52 | 51 | 93 | 92 | 7 |
| 5 | 200 | 1410 | 375.786 | .36 | 1.65 | 1.65 | 171 | 252 | 252 | 52 | 51 | 93 | 92 | 7 |
| | 205 | 1415 | 379.453 | .35 | 1.60 | 1.60 | 171 | 252 | 251 | 52 | 52 | 93 | 93 | 7 |
| | 210 | 1420 | 382.980 | .35 | 1.60 | 1.60 | 172 | 252 | 252 | 52 | 52 | 93 | 93 | 7 |
| | 215 | 1425 | 386.900 | .36 | 1.65 | 1.65 | 172 | 252 | 252 | 51 | 51 | 92 | 93 | 7 |
| 6 | 220 | 1430 | 389.960 | .36 | 1.65 | 1.65 | 172 | 250 | 246 | 52 | 51 | 92 | 92 | 7 |

312.0
316.5

$\Delta V_m$: ____ Δp: ____ ΔH: ____ $T_s$: ____ $T_m$: ____

PACIFIC ENVIRONMENTAL SERVICES, INC.

C[illegible] Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-1 Date: 01/31/01
Pretest Leak Rate: 0.010 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): DDH
$P_{bar}$: 29.9 $P_s$: +.15
$CO_2$: 5 $O_2$: 12
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8 $A_s$: 185.78

Nozzle ID: XXIV .310 Thermocouple No.: RT-6
Assumed $B_{ws}$: ~3% Filter No.: DF
Meter Box No.: RMB-15 Y: .995 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

K = 4.745

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hr) | Gas Meter Reading ($V_m$, $ft^3$) | Velocity Head ($\Delta P$, in $H_2O$) | Orifice Pressure Differential ($\Delta H$, in $H_2O$) | | Stack Temp (°F) | Probe Temp (°F) | Filter Temp (°F) | Impinger Temp (°F) | XAD Temp (°F) | Dry Gas Meter Temperature (°F) | | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Desired | Actual | | | | | | Inlet | Outlet | |
| | | | 393.810 | | | | | | | | | | | |
| | 225 | 1935 | ~~[illegible]~~ | .36 | 1.605 | 1.605 | 172 | 251 | 248 | 48 | 48 | 93 | 94 | 7 |
| | 230 | 1940 | 397.740 | .36 | 1.605 | 1.605 | 171 | 252 | 249 | 48 | 49 | 93 | 93 | 7 |
| | 235 | 1945 | 401.342 | .33 | 1.51 | 1.51 | 171 | 251 | 247 | 49 | 49 | 93 | 92 | 7 |
| | 240 | 1950 | 405.021 | .34 | 1.56 | 1.56 | 172 | 252 | 250 | 49 | 48 | 93 | 93 | 7 |

$\Delta V_m$: ______ $\Delta p$: ______ $\Delta H$: ______ $T_s$: ______ $T_m$: ______

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# Sample Train Recovery Data
## EPA Method 23

Facility: Andrews AFB - MD
Project No.: F181.001
Date: 1/30/01
Run No.: M23 - 1
Clean-up person: MDM
Sampling Location: Incinerator Outlet
Field Team Leader: MDM
Samplers: DDH, JF, MDM
Comments:

### Front-Half Data

Filter No.: un-numbered Filter Media: G/F Tare Wt (mg):

Filter No.: Filter Media: Tate Wt (mg):

### Back-Half Data

| | XAD-2 Sorbent Resin Trap | Knock-out Impinger | Impinger No. 1 |
|---|---|---|---|
| Contents: | XAD-2 Sorbent Resin | MT | 100 ml HPLC $H_2O$ |
| Final mass (g): | 326.5 | 791.5 | 583.2 |
| Initial mass (g): | 308.8 | 495.7 | 584.3 |
| Net Mass (g) | 17.7 | 295.8 | (1.1) |

| | Impinger No. 2 | Impinger No. 3 | Impinger No. 4 |
|---|---|---|---|
| Contents: | 100 ml HPLC $H_2O$ | MT | Silica Gel |
| Final mass (g): | 683.5 | 643.7 | 1081.4 |
| Initial mass (g): | 684.9 | 640.9 | 1015.7 |
| Net Mass (g) | (1.4) | 2.8 | 65.7 |

Total Moisture Collected: (g): 1,390.2

Description of Impinger Catch: F 800.7 F 787.1
F 841.3
Impinger #2 I 461.1 No 3 I 496.1 No 4 I 461.2
Net. 380.2 304.6 325.9

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-2 Date: 01/31/01
Pretest Leak Rate: 0.009 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): DDH
$P_{bar}$: 29.9 $P_s$: +.15
$CO_2$: 5 $O_2$: 12
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8" $A_s$: 185.78

Nozzle ID: ~~XXIV~~ .310 Thermocouple No.: RT6
Assumed $B_{ws}$: ~32 Filter No.: DF
Meter Box No.: RMB-5 Y: .995 ΔH@: 1.80
Posttest Leak Rate: 0.009 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: +3" ✓ Orsat: N/A

K= 4.745 ~~K=5.45625~~ MDM

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hr) | Gas Meter Reading ($V_m$, $ft^3$) | Velocity Head (ΔP, in $H_2O$) | Orifice Pressure Differential (ΔH, in $H_2O$) Desired | Actual | Stack Temp (°F) | Probe Temp (°F) | Filter Temp (°F) | Impinger Temp (°F) | XAD Temp (°F) | Dry Gas Meter Temperature (°F) Inlet | Outlet | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A 1 | 0 | 1610 | 400.115 | | | | | | | | | | | |
| | [illegible] | 1615 | 410.102 | .34 | 1.63 | 1.63 | 171 | 254 | 251 | 49 | 47 | 89 | 89 | 6 |
| | 10 | 1620 | 414.107 | .34 | 1.61 | 1.61 | 171 | 254 | 252 | 49 | 47 | 89 | 89 | 6 |
| | 15 | 1625 | 418.109 | .34 | 1.61 | 1.61 | 171 | 252 | 251 | 49 | 47 | 89 | 89 | 6 |
| 2 | 20 | 1640 | 421.096 | .34 | 1.61 | 1.61 | 171 | 252 | 251 | 44 | 47 | 89 | 89 | 6 |
| | 25 | 1645 | 424.460 | .36 | 1.61 | 1.61 | 172 | 253 | 251 | 48 | 48 | 100 | 100 | 6 |
| | 30 | 1650 | 427.890 | .36 | 1.70 | 1.70 | 172 | 253 | 251 | 48 | 48 | 100 | 100 | 6 |
| | 35 | 1655 | 431.325 | .33 | 1.56 | 1.56 | 172 | 252 | 251 | 49 | 48 | 101 | 100 | 6 |
| 3 | 40 | 1700 | 434.850 | .34 | 1.61 | 1.61 | 172 | 252 | 251 | 50 | 50 | 102 | 102 | 6 |
| | 45 | 1705 | 438.460 | .34 | 1.61 | 1.61 | 172 | 252 | 251 | 50 | 50 | 102 | 102 | 6 |
| | 50 | 1710 | 441.609 | .35 | 1.66 | 1.66 | 172 | 253 | 252 | 51 | 51 | 102 | 102 | 6 |
| | 55 | 1715 | 445.300 | .34 | 1.61 | 1.61 | 172 | 252 | 250 | 52 | 50 | 102 | 102 | 6 |
| 4 | 60 | 1720 | 449.017 | .34 | 1.61 | 1.61 | 172 | 252 | 250 | 51 | 50 | 102 | 102 | 6 |
| | 65 | 1735 | 453.260 | .34 | 1.61 | 1.61 | 172 | 252 | 250 | 52 | 52 | 102 | 102 | 6 |
| | 70 | 1740 | 457.140 | .34 | 1.61 | 1.61 | 172 | 253 | 251 | 51 | 51 | 102 | 102 | 6 |
| | 75 | 1745 | 460.680 | .36 | 1.70 | 1.70 | 172 | 253 | 252 | 51 | 51 | 103 | 102 | 6 |
| 5 | 80 | 1750 | 464.250 | .35 | 1.66 | 1.66 | 172 | 253 | 251 | 52 | 52 | 103 | 104 | 6 |
| | 85 | 1755 | 468.270 | .35 | 1.90 | 1.90 | 173 | 252 | 251 | 51 | 51 | 108 | 104 | 6 |
| | 90 | 1800 | 473.171 | .30 | 1.64 | 1.64 | 173 | 252 | 251 | 52 | 52 | 108 | 104 | 6 |
| | 95 | 1805 | 476.910 | .35 | 1.90 | 1.90 | 173 | 252 | 251 | 52 | 52 | 108 | 104 | 6 |
| 6 | 100 | 1810 | 480.130 | .37 | 2.01 | 2.01 | 172 | 252 | 251 | 52 | 52 | 108 | 105 | 6 |
| | 105 | 1815 | 484.140 | .37 | 2.01 | 2.01 | 172 | 251 | 252 | 52 | 50 | 108 | 105 | 6 |
| | 110 | 1820 | 487.702 | .36 | 1.96 | 1.96 | 172 | 252 | 252 | 51 | 51 | 108 | 106 | 6 |

$\Delta V_m$:______ Δp:______ ΔH:______ $T_s$:______ $T_m$:______

Page ___ of ___ Pages

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-2 Date: 01/31/01
Pretest Leak Rate: 0.009 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): DDH
$P_{bar}$: 29.9 $P_s$: +.15
$CO_2$: 5 $O_2$: 12
Probe Length/Type: 3'-Glass Pitot #: 8P-19
Stack Diameter: 15 3/8 $A_s$: 185.78

Nozzle ID: ~~XXIII~~ -.310 Thermocouple No.: 8T-6
Assumed $B_{ws}$: 32 Filter No.: DF
Meter Box No.: RMB-15 Y: .995 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

K = 5.45675 K = 5.80

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hr) | Gas Meter Reading ($V_m$, $ft^3$) | Velocity Head (ΔP, in $H_2O$) | Orifice Pressure Differential (ΔH, in $H_2O$) Desired | Actual | Stack Temp (°F) | Probe Temp (°F) | Filter Temp (°F) | Impinger Temp (°F) | XAD Temp (°F) | Dry Gas Meter Temperature (°F) Inlet | Outlet | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 115 | 1825 | 491.670 | [illegible] | 2.12 | 2.12 | 172 | 251 | 252 | 46 | 45 | 108 | 107 | 7 |
| [illegible] | 120/0 | 1830 | 495.550 | [illegible] | 1.96 | 1.96 | 171 | 253 | 251 | 46 | 45 | 108 | 106 | 7 |
| | 125 | 1840 | 499.430 | .30 | 1.74 | 1.74 | 172 | [illegible] | 251 | 46 | 45 | 108 | 107 | 7 |
| | 130 | 1845 | 502.910 | .32 | 1.74 | 1.74 | 172 | [illegible] | 251 | 47 | 46 | 108 | 107 | 7 |
| | 135 | 1850 | 506.400 | .32 | 1.74 | 1.74 | 171 | [illegible] | 251 | 47 | 46 | 108 | 108 | 7 |
| 2 | 140 | 1855 | 510.150 | .34 | [illegible] | 1.86 | 172 | [illegible] | 250 | 47 | 47 | 107 | 108 | 7 |
| | 145 | 1900 | 514.000 | .34 | 1.86 | 1.86 | 172 | 252 | 251 | 46 | 47 | 107 | 108 | 7 |
| | 150 | 1905 | 518.100 | .35 | 2.03 | 2.03 | 172 | 251 | 250 | 46 | 47 | 107 | 106 | 7 |
| | 155 | 1910 | 521.900 | .37 | 2.14 | 2.14 | 172 | 252 | 250 | 47 | 47 | 107 | 107 | 7 |
| 3 | 160 | 1915 | 526.217 | .35 | 2.03 | 2.03 | 172 | 251 | 251 | 48 | 47 | 108 | 108 | 7 |
| | 165 | 1920 | 529.740 | .35 | 2.03 | 2.03 | 172 | 252 | 252 | 48 | 47 | 108 | 108 | 7 |
| | 170 | 1925 | 533.680 | .33 | 1.91 | 1.91 | 172 | 252 | 250 | 48 | 48 | 108 | 107 | 7 |
| | 175 | 1930 | 537.520 | .33 | 1.91 | 1.91 | 172 | 252 | 251 | 48 | 47 | 108 | 108 | 7 |
| 4 | 180 | 1935 | 541.630 | .38 | 2.20 | 2.20 | 172 | 253 | 251 | 48 | 47 | 108 | 107 | 7 |
| | 185 | 1945 | 545.802 | .38 | 2.08 | 2.08 | 172 | 253 | 252 | 48 | 48 | 108 | 108 | 7 |
| | 190 | 1950 | 549.510 | .38 | 2.20 | 2.20 | 171 | 252 | 251 | 48 | 48 | 109 | 108 | 7 |
| | 195 | 1955 | 553.210 | .31 | 1.79 | 1.79 | 171 | 252 | 251 | 48 | 49 | 109 | 109 | 7 |
| 5 | 200 | 2000 | 556.500 | .31 | 1.79 | 1.79 | 171 | 252 | 252 | 48 | 49 | 109 | 109 | 10 |
| | 205 | 2005 | 560.017 | .26 | 1.50 | 1.50 | 171 | 251 | 250 | 48 | 48 | 109 | 110 | 10 |
| | 210 | 2010 | 563.405 | .26 | 1.50 | 1.50 | 170 | 252 | 251 | 48 | 49 | 109 | 110 | 10 |
| | 215 | 2015 | 567.012 | .26 | 1.50 | 1.50 | 172 | 252 | 251 | 48 | 49 | 109 | 110 | 10 |
| [illegible] | 220 | 2020 | 570.280 | .27 | 1.56 | 1.56 | 172 | 251 | 251 | 48 | 49 | 109 | 109 | 10 |

$\Delta V_m$:____ Δp:____ ΔH:____ $T_s$:____ $T_m$:____

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-2 Date: 01/31/01
Pretest Leak Rate: 0.009 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ +3" Orsat: N/A

Sample Type: M23 Operator(s): DDH
$P_{bar}$: 29.9 $P_s$: -.15
$CO_2$: 5 $O_2$: 12
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8" $A_s$: 185.78

Nozzle ID: XXIV .310 Thermocouple No.: RT-6
Assumed $B_{ws}$: 32 Filter No.: DF
Meter Box No.: RMB-15 γ: .995 ΔH@: 1.80
Posttest Leak Rate: 0.009 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hr) | Gas Meter Reading ($V_m$, $ft^3$) | Velocity Head ($\Delta P$, in $H_2O$) | Orifice Pressure Differential ($\Delta H$, in $H_2O$) Desired | Actual | Stack Temp (°F) | Probe Temp (°F) | Filter Temp (°F) | Impinger Temp (°F) | XAD Temp (°F) | Dry Gas Meter Temperature (°F) Inlet | Outlet | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 225 | 2025 | 574.010 | .30 | 1.74 | 1.74 | 172 | 252 | 251 | 49 | 48 | 109 | 109 | 10 |
| | 230 | 2030 | 577.210 | .30 | 1.74 | 1.74 | 171 | 251 | 250 | 49 | 48 | 109 | 109 | 10 |
| | 235 | 2035 | 580.802 | .31 | 1.79 | 1.79 | 171 | 252 | 251 | 49 | 49 | 109 | 108 | 10 |
| | 240 | 2040 | 581.155 | .31 | 1.79 | 1.79 | 172 | 252 | 251 | 49 | 49 | 109 | 108 | 10 |

$\Delta V_m$:____ $\Delta p$:____ $\Delta H$:____ $T_s$:____ $T_m$:____

Page ___ of ___ Pages

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# Sample Train Recovery Data
# EPA Method 23

Facility: Andrews AFB - MD
Project No.: F181.002
Date: 1/31/01
Run No.: M23-2
Clean-up person: MDM
Sampling Location: Incinerator Outlet
Field Team Leader: MDM
Samplers: MDM, JF, DDH
Comments:

## Front-Half Data

Filter No.: un-numbered Filter Media: G/F Tare Wt (mg):

Filter No.: Filter Media: Tate Wt (mg):

## Back-Half Data

| | XAD-2 Sorbent Resin Trap | Knock-out Impinger | Impinger No. 1 |
|---|---|---|---|
| Contents: | XAD-2 Sorbent Resin | MT | 100 ml HPLC $H_2O$ |
| Final mass (g): | — | 654.3 | 621.8 |
| Initial mass (g): | 276.5 | 464.2 | 619.8 |
| Net Mass (g) | — | 190.1 | 2.0 |

| | Impinger No. 2 | Impinger No. 3 | Impinger No. 4 |
|---|---|---|---|
| Contents: | 100 ml HPLC $H_2O$ | MT | Silica Gel |
| Final mass (g): | 743.7 | 512.0 | 943.3 |
| Initial mass (g): | 743.6 | 507.5 | 883.9 |
| Net Mass (g) | 0.1 | 4.5 ~~13.5~~ | 59.4 |

Total Moisture Collected: (g): ~~1190.7~~ 1,256.9

Description of Impinger Catch:

No. 2 F 702.3 No. 3 F 819.0 No. 4 F 787.1

I 461.5 I 464.7 I 461.4

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-3 Date: 02-01-01
Pretest Leak Rate: 0.008 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): DDH
$P_{bar}$: 29.90 $P_s$: +.14
$CO_2$: 5 $O_2$: 12
Probe Length/Type: 3' Glass Pitot #: RP-14
Stack Diameter: 15 3/8" $A_s$: 185.78

Nozzle ID: .310 Thermocouple No.: RT-6
Assumed $B_{ws}$: ~32 Filter No.: DF
Meter Box No.: RMB-15 γ: 0.995 ΔH@: 1.80
Posttest Leak Rate: 0.00 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

(K=5.00)

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hr) | Gas Meter Reading ($V_m$, ft³) | Velocity Head (ΔP, in $H_2O$) | Orifice Pressure Differential (ΔH, in $H_2O$) Desired | Orifice Pressure Differential (ΔH, in $H_2O$) Actual | Stack Temp (°F) | Probe Temp (°F) | Filter Temp (°F) | Impinger Temp (°F) | XAD Temp (°F) | Dry Gas Meter Temperature (°F) Inlet | Dry Gas Meter Temperature (°F) Outlet | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A 1 | 0 | 0910 | 584.200 | | | | | | | | | | | |
| | 5 | 0915 | 587.775 | .35 | 1.75 | 1.75 | ~~252~~ 171 | 252 | 249 | 49 | 49 | 96 | 96 | 6 |
| | 10 | 0920 | 591.243 | .36 | 1.80 | 1.80 | 171 | 252 | 251 | 49 | 49 | 97 | 96 | 6 |
| | 15 | 0925 | 595.020 | .36 | 1.80 | 1.80 | 171 | 252 | 251 | 48 | 48 | 97 | 97 | 6 |
| 2 | 20/0 | 0930 | 598.750 | .35 | 1.75 | 1.75 | 171 | 252 | 252 | 48 | 48 | 97 | 98 | 6 |
| | 25 | 0935 | 602.301 | .38 | 1.90 | 1.90 | 171 | 252 | 252 | 49 | 48 | 97 | 97 | 6 |
| | 30 | 0940 | 606.012 | .35 | 1.75 | 1.75 | 170 | 252 | 252 | 50 | 50 | 97 | 97 | 6 |
| | 35 | 0945 | 609.902 | .35 | 1.75 | 1.75 | 172 | 252 | 251 | 50 | 50 | 97 | 97 | 6 |
| 3 | 40/0 | 0950 | 613.820 | .32 | 1.60 | 1.60 | 171 | 251 | 251 | 51 | 50 | 98 | 97 | 6 |
| | 45 | 0955 | 617.125 | .32 | 1.60 | 1.60 | 171 | 252 | 251 | 52 | 51 | 98 | 98 | 6 |
| | 50 | 1000 | 620.705 | .35 | 1.75 | 1.75 | 171 | 253 | 251 | 52 | 51 | 98 | 97 | 6 |
| | 55 | 1005 | 624.387 | .36 | 1.80 | 1.80 | 171 | 253 | 252 | 52 | 52 | 98 | 98 | 6 |
| 4 | 60/0 | 1010 | 627.570 | .36 | 1.80 | 1.80 | 171 | 253 | 252 | 52 | 51 | 99 | 98 | 6 |
| | 65 | 1020 | 631.370 | .36 | 1.80 | 1.80 | 171 | 252 | 251 | 52 | 51 | 99 | 98 | 6 |
| | 70 | 1025 | 635.200 | .36 | 1.80 | 1.80 | 172 | 252 | 251 | 52 | 51 | 99 | 98 | 6 |
| | 75 | 1030 | 638.810 | .36 | 1.80 | 1.80 | 172 | 252 | 251 | 52 | 52 | 99 | 99 | 6 |
| 5 | 80/0 | 1035 | 642.400 | .35 | 1.75 | 1.75 | 172 | 251 | 251 | 52 | 52 | 99 | 98 | 6 |
| | 85 | 1040 | 646.035 | .35 | 1.75 | 1.75 | 172 | 252 | 252 | 52 | 52 | 99 | 98 | 6 |
| | 90 | 1045 | 649.830 | .33 | 1.65 | 1.65 | 172 | 251 | 251 | 52 | 51 | 99 | 99 | 6 |
| | 95 | 1050 | 653.550 | .34 | 1.70 | 1.70 | 172 | 252 | 251 | 52 | 52 | 99 | 99 | 6 |
| 6 | 100 | 1055 | 657.030 | .34 | 1.70 | 1.70 | 172 | 252 | 251 | 52 | 51 | 99 | 99 | 6 |
| | 105 | 1100 | 660.317 | .35 | 1.75 | 1.75 | 172 | 251 | 251 | 51 | 51 | 99 | 99 | 6 |
| | 110 | 1105 | 664.135 | .35 | 1.75 | 1.75 | 172 | 251 | 251 | 51 | 51 | 99 | 99 | 6 |

$\Delta V_m$:_____ $\Delta p$:_____ $\Delta H$:_____ $T_s$:_____ $T_m$:_____

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-3 Date: 02-01-01
Pretest Leak Rate: 0.008 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A (+30")

Sample Type: M23 Operator(s): DDH
$P_{bar}$: 29.9 $P_s$: + .14
$CO_2$: 5 $O_2$: 12
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8 $A_s$: 185.78

Nozzle ID: .310 Thermocouple No.: RT-6
Assumed $B_{ws}$: ~2% Filter No.: DF
Meter Box No.: RMB-15 γ: 0.995 ΔH@: 1.80
Posttest Leak Rate: .008 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: ___

[K=5.00]

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hr) | Gas Meter Reading ($V_m$, ft$^3$) | Velocity Head (ΔP, in $H_2O$) | Orifice Pressure Differential (ΔH, in $H_2O$) Desired | Actual | Stack Temp (°F) | Probe Temp (°F) | Filter Temp (°F) | Impinger Temp (°F) | XAD Temp (°F) | Dry Gas Meter Temperature (°F) Inlet | Outlet | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 115 | 1110 | 667.870 | .37 | 1.85 | 1.85 | 172 | 253 | 251 | 49 | 48 | 101 | 101 | 7 |
| 706 1 | 120/0 | 1115 | 671.546 | .37 | 1.85 | 1.85 | 172 | 252 | 252 | 46 | 47 | 101 | 101 | 7 |
| | 125 | 1135 | 675.520 | .37 | 1.85 | 1.85 | 172 | 252 | 251 | 46 | 46 | 101 | 101 | 7 |
| | 130 | 1140 | 679.400 | .36 | 1.80 | 1.80 | 172 | 251 | 252 | 47 | 48 | 101 | 102 | 7 |
| | 135 | 1145 | 683.145 | .36 | 1.80 | 1.80 | 172 | 251 | 252 | 47 | 48 | 101 | 102 | 7 |
| 2 | 140 | 1150 | 687.019 | .35 | 1.75 | 1.75 | 172 | 252 | 250 | 47 | 47 | 102 | 102 | 7 |
| | 145 | 1155 | 690.730 | .35 | 1.75 | 1.75 | 172 | 251 | 251 | 47 | 47 | 102 | 102 | 7 |
| | 150 | 1200 | 694.121 | .35 | 1.75 | 1.75 | 172 | 251 | 251 | 47 | 47 | 101 | 102 | 7 |
| | 155 | 1205 | 697.940 | .34 | 1.70 | 1.70 | 172 | 252 | 251 | 47 | 48 | 101 | 101 | 7 |
| 3 | 160 | 1210 | 701.133 | .34 | 1.70 | 1.70 | 172 | 252 | 251 | 47 | 48 | 101 | 101 | 7 |
| | 165 | 1215 | 705.217 | .35 | 1.75 | 1.75 | 172 | 251 | 251 | 47 | 47 | 101 | 101 | 7 |
| | 170 | 1220 | 708.860 | .35 | 1.75 | 1.75 | 172 | 252 | 251 | 47 | 47 | 102 | 101 | 7 |
| | 175 | 1225 | 712.406 | .35 | 1.75 | 1.75 | 172 | 251 | 251 | 47 | 47 | 102 | 102 | 7 |
| 4 | 180 | 1230 | 716.030 | .36 | 1.80 | 1.80 | 172 | 252 | 251 | 48 | 47 | 102 | 102 | 7 |
| | 185 | 1235 | 719.620 | .35 | 1.75 | 1.75 | 172 | 251 | 251 | 48 | 47 | 102 | 102 | 7 |
| | 190 | 1240 | 724.017 | .36 | 1.80 | 1.80 | 172 | 252 | 252 | 48 | 48 | 103 | 102 | 7 |
| | 195 | 1245 | 727.217 | .36 | 1.80 | 1.80 | 172 | 252 | 251 | 48 | 47 | 103 | 103 | 7 |
| 5 | 200 | 1250 | 730.302 | .36 | 1.80 | 1.80 | 172 | 252 | 251 | 48 | 47 | 103 | 102 | 7 |
| | 205 | 1255 | 734.001 | .32 | 1.60 | 1.60 | 172 | 252 | 252 | 49 | 48 | 103 | 103 | 7 |
| | 210 | 1300 | 737.615 | .32 | 1.60 | 1.60 | 172 | 252 | 251 | 49 | 48 | 103 | 103 | 7 |
| | 215 | 1305 | – | .32 | 1.60 | 1.60 | 172 | 250 | 251 | 49 | 49 | 103 | 102 | 7 |
| 6 | 220 | 1310 | – | 0.32 | 1.60 | 1.60 | 172 | 251 | 251 | 50 | 49 | 103 | 102 | 7 |

$\Delta V_m$:____ $\Delta p$:____ $\Delta H$:____ $T_s$:____ $T_m$:____

# FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Incinerator Outlet
Run Number: M23-3 Date: 2/1/01
Pretest Leak Rate: 0.008 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: — Orsat: N/A

Sample Type: Method 23 Operator: DMH/MMM
Pbar: 29.9 Ps: + 0.14
CO2: ~5 O2: ~12
Probe Length/Type: 3'-glass Pitot #: PP-A
Stack Diameter: 15 3/8 As:

Nozzle ID: 0.310 Thermocouple #: RT-6
Assumed Bws: ~25 Filter #: Un-numbered
Meter Box #: ~~0.995~~ TMB-15 Y: ~~1.80~~ 0.995 ΔH@: 1.80
Post-Test Leak Rate: 0.03 cfm @ 12 in. Hg.
Post-Test Leak Check: Pitot: — Orsat: N/A

| Traverse Point Number | Sampling Time (min) | Clock Time (24-hour clock) | Gas Meter Reading (Vm) ft3 | Velocity Head (Δp) in H2O | Orifice Pressure Differential (ΔH) in H2O Desired | Orifice Pressure Differential (ΔH) in H2O Actual | Stack Temp. (Ts) | Temperature °F Probe | Temperature °F Filter | Impinger Temp. °F | Dry Gas Meter Temp. Inlet (Tm in °F) XAD | Dry Gas Meter Temp. Outlet (Tm out °F) | Pump Vacuum (in. Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 225 | 1315 | 751.0 | 0.32 | 1.6 | 1.6 | 173 | 250 | 251 | 50 | 49 | 103 / 102 | 7.5 |
| | 230 | 1320 | 755.6 | 0.32 | 1.6 | 1.6 | 172 | 250 | 252 | 50 | 49 | 103 / 102 | 7 |
| | 235 | 1325 | 759.8 | 0.33 | 1.65 | 1.65 | 172 | 249 | 252 | 52 | 49 | 104 / 102 | 7 |
| | 240 | 1330 | 764.302 | 0.32 | 1.6 | 1.6 | 171 | 250 | 252 | 54 | 51 | 104 / 103 | 7 |

ΔVm = ______ $\overline{\sqrt{\Delta p}}$ = ______ $\overline{\Delta H}$ = ______ $\overline{Ts}$ = ______ $\overline{Tm}$ = ______

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

# Sample Train Recovery Data
## EPA Method 23

Facility: Andrews AFB - MD
Project No.: F181.001
Date:
Run No.: M23-3
Clean-up person: MDM
Sampling Location:
Field Team Leader: MDM
Samplers: DMH, JF, MDM
Comments:

### Front-Half Data

Filter No.: un-numbered Filter Media: G/F Tare Wt (mg):

Filter No.: Filter Media: Tate Wt (mg):

### Back-Half Data

| | XAD-2 Sorbent Resin Trap | Knock-out Impinger | Impinger No. 1 |
|---|---|---|---|
| Contents: | XAD-2 Sorbent Resin | MT | 100 ml HPLC $H_2O$ |
| Final mass (g): | 320.0 | 824.8 | 578.8 |
| Initial mass (g): | 305.4 | 495.6 | 582.8 |
| Net Mass (g) | | 329.2 | |

| | Impinger No. 2 | Impinger No. 3 | Impinger No. 4 |
|---|---|---|---|
| Contents: | 100 ml HPLC $H_2O$ | MT | Silica Gel |
| Final mass (g): | 739.8 | 633.4 | 1083.2 |
| Initial mass (g): | 740.9 | 628.7 | 1024.0 |
| Net Mass (g) | | | |

Total Moisture Collected: (g):

Description of Impinger Catch:

No. 2 F 814.6 No. 3 F 729.1 ~~4~~91.9

T ~~461.5~~ 464.1 T 496.3 461.4

**Appendix B.3**

**Raw Field Data**

**Hydrogen Chloride**

PES

M26

# V~~OLATILE ORGANIC SAMPLI~~NG TRAIN ~~(VOST)~~ SAMPLING DATA

COMPANY: Andrews AFB

DATE: 01/31/01

TIME: 1145

METER #: VB-6

BAROMETRIC PRESSURE, in. Hg: 29.9

AMBIENT TEMPERATURE, °F:

CITY: Washington DC

LOCATION: Stack

RUN #: M26-1

Y-FACTOR: 1.004

OPERATOR: DDH

PURGE TIME:

## LEAK CHECK DATA

| | Vacuum Initial, (in. Hg) | Vacuum Final, (in. Hg) | Time, (min.) |
|---|---|---|---|
| Pre-test: | 15" ✓ | 15" ✓ | |
| Post-test: | 15" | 15" ✓ | |

| Sample Time (min) | Clock Time, (24-hr) | Meter Volume, (liter) | Rotometer Setting | Dry Gas Meter Temp., (°F) | Vacuum, (in. Hg) | WC |
|---|---|---|---|---|---|---|
| 0 | 10:45 | 1323.00 | 2.0 | 87 | 2 | 2.2 |
| 5 | 10:50 | 1333.35 | 2.0 | 87 | 2 | 2.2 |
| 10 | 10:55 | 1343.12 | 2.0 | 87 | 3 | 2.2 |
| 15 | 11:00 | 1353.21 | 2.0 | 88 | 3 | 2.2 |
| 20 | 11:05 | 1363.19 | 2.0 | 88 | 2 | 2.2 |
| 25 | 11:10 | 1373.31 | 2.0 | 88 | 3 | 2.2 |
| 30 | 11:15 | 1383.10 | 2.0 | 91 | 3 | 2.2 |
| 35 | 11:20 | 1393.70 | 2.0 | 91 | 3 | 2.2 |
| 40 | 11:25 | 1403.10 | 2.0 | 92 | 3 | 2.2 |
| 45 | 11:30 | 1413.21 | 2.0 | 92 | 3 | 2.2 |
| 50 | 11:35 | 1423.10 | 2.0 | 92 | 3 | 2.2 |
| 55 | 11:40 | 1433.01 | 2.0 | 92 | 3 | 2.2 |
| 60 | 11:45 | 1443.10 | | | | |

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b\,(\text{in. Hg})}{T_m\,(^\circ R)}$$

$V_{std} =$

PES

# VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB
CITY: DC
DATE: 01/31/01
LOCATION: Stack
TIME: 1610
RUN #: M26-2
METER #: VB-6
Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.9
OPERATOR: DDH
AMBIENT TEMPERATURE, °F:
PURGE TIME: 10

## LEAK CHECK DATA

ABORTED RUN

| | Vacuum Initial, (in. Hg) | Vacuum Final, (in. Hg) | Time, (min.) |
|---|---|---|---|
| Pre-test: | 15 | 15 | ✓ |
| Post-test: | 15 | 15 | X |

Run Aborted

40'
35'

| Sample Time (min) | Clock Time, (24-hr) | Meter Volume, (liter) | Rotometer Setting | Dry Gas Meter Temp., (°F) | Vacuum, (in. Hg) |
|---|---|---|---|---|---|
| 0 | 1610 | 1443.92 | 2.0 LPM | 89 | 3 |
| 5 | 1615 | 1453.87 | | 89 | 3 |
| 10 | 1620 | 1463.81 | | 90 | 3 |
| 15 | 1625 | 1473.72 | | 90 | 3 |
| 20 | 1630 | 1483.81 | | 91 | 3 |
| 25 | 1635 | 1493.21 | | 91 | 3 |
| | 1640 | 1503.17 | | 91 | 3 |
| | 1645 | 1513.21 | | 91 | 3 |
| | 1650 | 1523.20 | | 91 | 3 |
| | 1655 | 1533.17 | | 91 | 3 |
| | 1700 | 1543.22 | | 91 | 3 |
| | 1705 | 1553.17 | | 91 | |
| | 1710 | 1563.22 | | | |

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b\,(\text{in. Hg})}{T_m(°R)}$$

$V_{std} =$

PES

# VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB
DATE: ~~01/31/01~~ 02/01/01
TIME: 0910 - 1010
METER #: VB-6
BAROMETRIC PRESSURE, in. Hg: 29.90
AMBIENT TEMPERATURE, °F: 100

CITY: Washington DC
LOCATION: Stack
RUN #: M26-~~1~~ 2
Y-FACTOR: 1.004
OPERATOR: DDH
PURGE TIME:

## LEAK CHECK DATA

| | Vacuum Initial, (in. Hg) | Vacuum Final, (in. Hg) | Time, (min.) |
|---|---|---|---|
| Pre-test: | 15" | 15" | ✓ |
| Post-test: | 15" | 15" | ✓ |

| Sample Time (min) | Clock Time, (24-hr) | Meter Volume, (liter) | Rotometer Setting | Dry Gas Meter Temp., (°F) | Vacuum, (in. Hg) | WC |
|---|---|---|---|---|---|---|
| 0 | 0910 | 1565.55 | 2.0 (LPM) | 108 | 3 | 2.2 |
| 5 | 0915 | 1575.60 | 2.0 | 108 | 3 | 2.2 |
| 10 | 0920 | 1585.41 | 2.0 | 108 | 3 | 2.2 |
| 15 | 0925 | 1595.23 | 2.0 | 109 | 3 | 2.2 |
| 20 | 0930 | 1605.17 | 2.0 | 109 | 3 | 2.2 |
| 25 | 0935 | 1615.29 | 2.0 | 109 | 3 | 2.2 |
| 30 | 0940 | 1625.42 | 2.0 | 110 | 3 | 2.2 |
| 35 | 0945 | 1635.50 | 2.0 | 110 | 3 | 2.2 |
| 40 | 0950 | 1645.40 | 2.0 | 110 | 3 | 2.2 |
| 45 | 0955 | 1655.32 | 2.0 | 110 | 3 | 2.2 |
| 50 | 1000 | 1665.19 | 2.0 | 110 | 3 | 2.2 |
| 55 | 1005 | 1675.29 | 2.0 | 110 | 3 | 2.2 |
| 60 | 1010 | 1685.36 | 2.0 | 110 | 3 | |

Nitrogen purge/activated carbon packing in sample holding container:

$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b\,(\text{in. Hg})}{T_m\,(°R)}$

$V_{std} =$

~~460~~ 460
.34
1.91

# VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB CITY: Washington DC
DATE: 02-02-01 LOCATION: Stack
TIME: RUN #: M26-~~4~~ 3
METER #: VB-6 Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.9 OPERATOR: DDH
AMBIENT TEMPERATURE, °F: 89 PURGE TIME:

## LEAK CHECK DATA

| | Vacuum Initial, (in. Hg) | Final, (in. Hg) | Time, (min.) |
|---|---|---|---|
| Pre-test: | | | |
| Post-test: | | | |

| Sample Time (min) | Clock Time, (24-hr) | Meter Volume, (liter) | Rotometer Setting | Dry Gas Meter Temp., (°F) | Vacuum, (in. Hg) |
|---|---|---|---|---|---|
| 0 | 0945 | 2.0 | 1707.00 | 88 | 3 |
| 5 | 0950 | 2.0 | 1717.12 | 88 | 3 |
| 10 | 0955 | 2.0 | 1727.09 | 85 | 3 |
| 15 | 1000 | 2.0 | 1737.10 | 84 | 3 |
| 20 | 1005 | 2.0 | 1747.21 | 89 | 3 |
| 25 | 1010 | 2.0 | 1757.19 | 90 | 3 |
| 30 | 1015 | 2.0 | 1767.23 | 90 | 3 |
| 35 | 1025 | 2.0 | 1777.19 | 90 | 3 |
| 40 | 1030 | 2.0 | 1787.26 | 90 | 3 |
| 45 | 1035 | 2.0 | 1797.31 | 91 | 3 |
| 50 | 1040 | 2.0 | 1807.21 | 91 | 3 |
| 55 | 1045 | 2.0 | 1817.32 | 91 | 3 |
| (g) | 1050 | 2.0 | 1827.44 | | |

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b(\text{in. Hg})}{T_m(^\circ R)}$$

$V_{std}$=

## Appendix B.4

## Raw Field Data

## $CO_2$, $O_2$, $SO_2$, $NO_x$, CO CEMS (M3A, M6C, 7E, 10)

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M23-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 11:13:15 | 10.055 | 5.659 |
| 31-Jan-01 | 11:14:15 | 10.784 | 5.529 |
| 31-Jan-01 | 11:15:15 | 10.336 | 5.245 |
| 31-Jan-01 | 11:16:15 | 10.981 | 5.02 |
| 31-Jan-01 | 11:17:15 | 12.067 | 4.993 |
| 31-Jan-01 | 11:18:15 | 12.374 | 5.198 |
| 31-Jan-01 | 11:19:15 | 12.5 | 5.507 |
| 31-Jan-01 | 11:20:15 | 12.865 | 5.801 |
| 31-Jan-01 | 11:21:15 | 13.414 | 6.02 |
| 31-Jan-01 | 11:22:15 | 13.929 | 6.115 |
| 31-Jan-01 | 11:23:15 | 9.623 | 6.085 |
| 31-Jan-01 | 11:24:15 | 8.689 | 6.001 |
| 31-Jan-01 | 11:25:15 | 10.295 | 5.856 |
| 31-Jan-01 | 11:26:15 | 9.827 | 5.673 |
| 31-Jan-01 | 11:27:15 | 10.649 | 5.545 |
| 31-Jan-01 | 11:28:15 | 11.78 | 5.621 |
| 31-Jan-01 | 11:29:00 | 11 | 6 |
| 31-Jan-01 | 11:30:00 | 11.75 | 6 |
| 31-Jan-01 | 11:31:00 | 12.25 | 6.4 |
| 31-Jan-01 | 11:32:00 | 12.5 | 6.4 |
| 31-Jan-01 | 11:33:00 | 13 | 6.4 |
| 31-Jan-01 | 11:34:00 | 13.75 | 6.4 |
| 31-Jan-01 | 11:35:00 | 13.5 | 6.4 |
| 31-Jan-01 | 11:36:00 | 9.25 | 6.4 |
| 31-Jan-01 | 11:37:00 | 10 | 6.4 |
| 31-Jan-01 | 11:38:00 | 9.5 | 6 |
| 31-Jan-01 | 11:39:00 | 10.5 | 6.4 |
| 31-Jan-01 | 11:40:00 | 12 | 6.4 |
| 31-Jan-01 | 11:41:45 | 13.415 | 6.409 |
| 31-Jan-01 | 11:42:45 | 13.613 | 6.541 |
| 31-Jan-01 | 11:43:45 | 10.964 | 6.566 |
| 31-Jan-01 | 11:44:45 | 9.35 | 6.505 |
| 31-Jan-01 | 11:45:45 | 10.111 | 6.359 |
| 31-Jan-01 | 11:46:45 | 10.108 | 6.168 |
| 31-Jan-01 | 11:47:45 | 10.864 | 5.954 |
| 31-Jan-01 | 11:48:45 | 11.596 | 5.818 |
| 31-Jan-01 | 11:49:45 | 12.179 | 5.81 |
| 31-Jan-01 | 11:50:45 | 12.615 | 5.94 |
| 31-Jan-01 | 11:51:45 | 12.534 | 6.132 |
| 31-Jan-01 | 11:52:45 | 12.736 | 6.301 |
| 31-Jan-01 | 11:53:45 | 13.047 | 6.403 |

## Malcolm Grow Medical Center - Andrews AFB, MD

### Medical Waste Incinerator

CEM Responses

**M23-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 11:54:45 | 13.338 | 6.433 |
| 31-Jan-01 | 11:55:45 | 10.8 | 6.388 |
| 31-Jan-01 | 11:56:45 | 8.601 | 6.28 |
| 31-Jan-01 | 11:57:45 | 7.645 | 6.134 |
| 31-Jan-01 | 11:58:45 | 8.61 | 5.967 |
| 31-Jan-01 | 11:59:45 | 9.654 | 5.805 |
| 31-Jan-01 | 12:00:45 | 10.38 | 5.718 |
| 31-Jan-01 | 12:01:45 | 10.679 | 5.768 |
| 31-Jan-01 | 12:02:45 | 11.02 | 6.021 |
| 31-Jan-01 | 12:03:45 | 11.119 | 6.388 |
| 31-Jan-01 | 12:04:45 | 11.522 | 6.76 |
| 31-Jan-01 | 12:05:45 | 11.932 | 6.779 |
| 31-Jan-01 | 12:06:45 | 8.933 | 8.359 |
| 31-Jan-01 | 12:07:45 | 8.012 | 9.079 |
| 31-Jan-01 | 12:08:45 | 9.739 | 8.005 |
| 31-Jan-01 | 12:09:45 | 11.224 | 6.74 |
| 31-Jan-01 | 12:10:45 | 11.445 | 6.448 |
| 31-Jan-01 | 12:11:45 | 11.565 | 6.301 |
| 31-Jan-01 | 12:12:45 | 11.925 | 5.998 |
| 31-Jan-01 | 12:13:45 | 12.256 | 5.73 |
| 31-Jan-01 | 12:14:45 | 12.547 | 5.517 |
| 31-Jan-01 | 12:15:45 | 10.502 | 7.305 |
| 31-Jan-01 | 12:16:45 | 9.121 | 8.283 |
| 31-Jan-01 | 12:17:45 | 9.61 | 7.726 |
| 31-Jan-01 | 12:18:45 | 9.988 | 7.513 |
| 31-Jan-01 | 12:19:45 | 10.988 | 6.74 |
| 31-Jan-01 | 12:20:45 | 11.583 | 6.253 |
| 31-Jan-01 | 12:21:45 | 11.924 | 5.946 |
| 31-Jan-01 | 12:22:45 | 12.01 | 5.871 |
| 31-Jan-01 | 12:23:45 | 12.073 | 5.767 |
| 31-Jan-01 | 12:24:45 | 12.134 | 5.719 |
| 31-Jan-01 | 12:25:45 | 12.145 | 5.738 |
| 31-Jan-01 | | | |
| 31-Jan-01 | 12:27:48 | 12.242 | 5.641 |
| 31-Jan-01 | 12:28:48 | 12.423 | 5.557 |
| 31-Jan-01 | 12:29:48 | 12.76 | 5.277 |
| 31-Jan-01 | 12:30:48 | 12.007 | 5.786 |
| 31-Jan-01 | 12:31:48 | 6.936 | 10.28 |
| 31-Jan-01 | 12:32:48 | 7.837 | 9.129 |
| 31-Jan-01 | 12:33:48 | 9.992 | 7.577 |
| 31-Jan-01 | 12:34:48 | 11.469 | 6.464 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M23-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 12:35:48 | 11.682 | 6.202 |
| 31-Jan-01 | 12:36:48 | 11.73 | 6.079 |
| 31-Jan-01 | 12:37:48 | 11.967 | 5.846 |
| 31-Jan-01 | 12:38:48 | 12.083 | 5.728 |
| 31-Jan-01 | 12:39:48 | 12.353 | 5.545 |
| 31-Jan-01 | 12:40:48 | 12.815 | 5.239 |
| 31-Jan-01 | 12:41:48 | 8.464 | 9.2 |
| 31-Jan-01 | 12:42:48 | 7.617 | 9.285 |
| 31-Jan-01 | 12:43:48 | 8.816 | 8.44 |
| 31-Jan-01 | 12:44:48 | 11.097 | 6.856 |
| 31-Jan-01 | 12:45:48 | 11.683 | 6.518 |
| 31-Jan-01 | 12:46:48 | 11.833 | 6.536 |
| 31-Jan-01 | 12:47:48 | 12.445 | 6.529 |
| 31-Jan-01 | 12:48:48 | 12.839 | 6.495 |
| 31-Jan-01 | 12:49:48 | 13.121 | 6.4 |
| 31-Jan-01 | 12:50:48 | 12.778 | 6.238 |
| 31-Jan-01 | 12:51:48 | 8.399 | 6.026 |
| 31-Jan-01 | 12:52:48 | 8.944 | 5.809 |
| 31-Jan-01 | 12:53:48 | 10.595 | 5.629 |
| 31-Jan-01 | 12:54:48 | 11.406 | 5.591 |
| 31-Jan-01 | 12:55:48 | 12.046 | 5.871 |
| 31-Jan-01 | 12:56:48 | 12.483 | 6.343 |
| 31-Jan-01 | 12:57:48 | 12.66 | 6.73 |
| 31-Jan-01 | 12:58:48 | 12.849 | 6.906 |
| 31-Jan-01 | 12:59:48 | 12.907 | 6.893 |
| 31-Jan-01 | 13:00:48 | 13.156 | 6.722 |
| 31-Jan-01 | 13:01:48 | 13.396 | 6.487 |
| 31-Jan-01 | 13:02:48 | 13.774 | 6.236 |
| 31-Jan-01 | 13:03:48 | 9.86 | 6.002 |
| 31-Jan-01 | 13:04:48 | 10.645 | 5.796 |
| 31-Jan-01 | 13:05:48 | 11.49 | 5.625 |
| 31-Jan-01 | 13:06:48 | 11.997 | 5.473 |
| 31-Jan-01 | 13:07:48 | 12.523 | 5.411 |
| 31-Jan-01 | 13:08:48 | 13.028 | 5.502 |
| 31-Jan-01 | 13:09:48 | 13.311 | 5.705 |
| 31-Jan-01 | 13:10:48 | 13.266 | 5.884 |
| 31-Jan-01 | 13:11:48 | 13.717 | 6.012 |
| 31-Jan-01 | 13:12:48 | 13.691 | 6.021 |
| 31-Jan-01 | 13:13:48 | 7.006 | 5.962 |
| 31-Jan-01 | 13:14:48 | 7.752 | 5.84 |
| 31-Jan-01 | 13:21:28 | 13.122 | 6.398 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

## Medical Waste Incinerator

### CEM Responses

**M23-1**

| Date | Time | O2 | CO2 | |
|---|---|---|---|---|
| 31-Jan-01 | 13:22:28 | 13.458 | 6.662 | |
| 31-Jan-01 | 13:23:28 | 13.545 | 6.782 | |
| 31-Jan-01 | 13:24:28 | 13.678 | 6.76 | |
| 31-Jan-01 | 13:25:28 | 13.818 | 6.627 | |
| 31-Jan-01 | 13:26:28 | 13.498 | 6.448 | |
| 31-Jan-01 | 13:27:28 | 8.847 | 6.252 | |
| 31-Jan-01 | 13:28:28 | 10.286 | 6.042 | |
| 31-Jan-01 | 13:29:28 | 11.133 | 5.823 | |
| 31-Jan-01 | 13:30:28 | 12.002 | 5.646 | |
| 31-Jan-01 | 13:31:28 | 12.883 | 5.498 | |
| 31-Jan-01 | 13:32:28 | 13.114 | 5.388 | |
| 31-Jan-01 | 13:33:28 | 13.604 | 5.395 | |
| 31-Jan-01 | 13:34:28 | 13.621 | 5.488 | |
| 31-Jan-01 | 13:35:28 | 14.023 | 5.645 | |
| 31-Jan-01 | 13:36:28 | 11.906 | 5.788 | |
| 31-Jan-01 | 13:37:28 | 7.151 | 5.875 | |
| 31-Jan-01 | 13:38:28 | 8.413 | 5.902 | |
| 31-Jan-01 | 13:39:28 | 10.824 | 5.858 | |
| 31-Jan-01 | 13:40:28 | 12.032 | 5.772 | |
| 31-Jan-01 | 13:41:28 | | | |
| 31-Jan-01 | 13:42:28 | | | |
| 31-Jan-01 | 13:43:28 | | | |
| 31-Jan-01 | 13:44:28 | | | |
| 31-Jan-01 | 13:45:28 | | | |
| 31-Jan-01 | 13:46:28 | | | Cal Check |
| 31-Jan-01 | 13:47:28 | | | |
| 31-Jan-01 | 13:48:28 | | | |
| 31-Jan-01 | 13:49:28 | | | |
| 31-Jan-01 | 13:50:28 | | | |
| 31-Jan-01 | 13:51:28 | | | |
| 31-Jan-01 | 13:52:28 | | | |
| 31-Jan-01 | 13:53:28 | 12.621 | 5.473 | |
| 31-Jan-01 | 13:54:28 | 12.871 | 5.265 | |
| 31-Jan-01 | 13:55:28 | 13.048 | 5.089 | |
| 31-Jan-01 | 13:56:28 | 13.23 | 4.976 | |
| 31-Jan-01 | 13:57:28 | 13.713 | 4.601 | |
| 31-Jan-01 | 13:58:28 | 14.062 | 4.329 | |
| 31-Jan-01 | 13:59:28 | 14.146 | 4.326 | |
| 31-Jan-01 | 14:00:28 | 9.544 | 8.492 | |
| 31-Jan-01 | 14:01:28 | 10.043 | 7.492 | |
| 31-Jan-01 | 14:02:28 | 10.03 | 7.423 | |

## Malcolm Grow Medical Center - Andrews AFB, MD

### Medical Waste Incinerator
CEM Responses

**M23-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 14:03:28 | 11.203 | 6.543 |
| 31-Jan-01 | 14:04:28 | 11.992 | 5.932 |
| 31-Jan-01 | 14:05:28 | 12.75 | 5.32 |
| 31-Jan-01 | 14:06:28 | 13.009 | 5.089 |
| 31-Jan-01 | 14:07:28 | 13.187 | 4.976 |
| 31-Jan-01 | 14:08:28 | 13.815 | 4.542 |
| 31-Jan-01 | 14:09:28 | 14.248 | 4.216 |
| 31-Jan-01 | 14:10:28 | 14.24 | 4.178 |
| 31-Jan-01 | 14:11:28 | 14.347 | 4.097 |
| 31-Jan-01 | 14:12:28 | 14.618 | 3.894 |
| 31-Jan-01 | 14:13:28 | 14.697 | 3.828 |
| 31-Jan-01 | 14:14:28 | 14.873 | 3.768 |
| 31-Jan-01 | 14:15:28 | 10.243 | 7.832 |
| 31-Jan-01 | 14:16:28 | 9.986 | 7.5 |
| 31-Jan-01 | 14:17:28 | 9.246 | 7.792 |
| 31-Jan-01 | 14:18:28 | 9.805 | 7.58 |
| 31-Jan-01 | 14:19:28 | 11.121 | 6.548 |
| 31-Jan-01 | 14:20:28 | 12.251 | 5.755 |
| 31-Jan-01 | 14:21:28 | 13.267 | 4.976 |
| 31-Jan-01 | 14:22:28 | 13.933 | 4.482 |
| 31-Jan-01 | 14:23:28 | 14.08 | 4.295 |
| 31-Jan-01 | 14:24:28 | 14.354 | 4.122 |
| 31-Jan-01 | 14:25:28 | 14.684 | 3.864 |
| 31-Jan-01 | 14:26:28 | 14.592 | 3.888 |
| 31-Jan-01 | 14:27:28 | 14.781 | 3.763 |
| 31-Jan-01 | 14:28:28 | 15.141 | 3.581 |
| 31-Jan-01 | 14:29:28 | 10.97 | 7.203 |
| 31-Jan-01 | 14:30:28 | 10.477 | 7.225 |
| 31-Jan-01 | 14:31:28 | 9.971 | 7.284 |
| 31-Jan-01 | 14:32:28 | 10.297 | 7.242 |
| 31-Jan-01 | 14:33:28 | 12.03 | 5.878 |
| 31-Jan-01 | 14:34:28 | 13.047 | 5.137 |
| 31-Jan-01 | 14:35:28 | 13.439 | 4.792 |
| 31-Jan-01 | 14:36:28 | 13.944 | 4.455 |
| 31-Jan-01 | 14:37:28 | 14.03 | 4.358 |
| 31-Jan-01 | 14:38:28 | 14.324 | 4.145 |
| 31-Jan-01 | 14:39:28 | 14.53 | 3.97 |
| 31-Jan-01 | 14:40:28 | 14.803 | 3.825 |
| 31-Jan-01 | 14:41:28 | 11.39 | 6.654 |
| 31-Jan-01 | 14:42:28 | 8.339 | 8.695 |
| 31-Jan-01 | 14:43:28 | 8.546 | 8.532 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M23-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 14:44:28 | 9.154 | 8.18 |
| 31-Jan-01 | 14:45:28 | 10.339 | 7.289 |
| 31-Jan-01 | 14:46:28 | 11.113 | 6.65 |
| 31-Jan-01 | 14:47:28 | 11.122 | 6.624 |
| 31-Jan-01 | 14:48:28 | 11.325 | 6.423 |
| 31-Jan-01 | 14:49:28 | 11.308 | 6.383 |
| | | | |
| Average | M23-1 | 11.7 | 6.1 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-2**

| Date | Time | O2 | CO2 | |
|---|---|---|---|---|
| 31-Jan-01 | 16:10:42 | 13.981 | 4.38 | |
| 31-Jan-01 | 16:11:42 | 14.323 | 4.125 | |
| 31-Jan-01 | 16:12:42 | 14.511 | 3.97 | |
| 31-Jan-01 | 16:13:42 | 14.717 | 3.81 | |
| 31-Jan-01 | 16:14:42 | 15.139 | 3.565 | |
| 31-Jan-01 | 16:15:42 | 11.357 | 6.914 | |
| 31-Jan-01 | 16:16:42 | 8.068 | 8.967 | |
| 31-Jan-01 | 16:17:42 | 9.252 | 8.032 | |
| 31-Jan-01 | 16:18:42 | 10.875 | 6.827 | |
| 31-Jan-01 | 16:19:42 | 12.376 | 5.693 | |
| 31-Jan-01 | 16:20:42 | 12.874 | 5.242 | |
| 31-Jan-01 | 16:21:42 | 13.247 | 4.908 | |
| 31-Jan-01 | 16:22:42 | 13.504 | 4.713 | |
| 31-Jan-01 | 16:23:42 | 13.887 | 4.435 | |
| 31-Jan-01 | 16:24:42 | 14.188 | 4.208 | |
| 31-Jan-01 | 16:25:42 | 14.625 | 3.936 | |
| 31-Jan-01 | 16:26:42 | 10.514 | 7.581 | |
| 31-Jan-01 | 16:27:42 | 9.016 | 8.377 | |
| 31-Jan-01 | 16:28:42 | 9.451 | 7.862 | |
| 31-Jan-01 | 16:29:42 | 10.719 | 6.888 | |
| 31-Jan-01 | 16:30:42 | 11.758 | 6.1 | |
| 31-Jan-01 | 16:31:42 | 12.387 | 5.596 | |
| 31-Jan-01 | 16:32:42 | 12.623 | 5.362 | |
| 31-Jan-01 | 16:33:42 | 12.948 | 5.121 | |
| 31-Jan-01 | 16:34:42 | 13.485 | 4.691 | |
| 31-Jan-01 | 16:35:42 | 13.512 | 4.661 | |
| 31-Jan-01 | 16:36:42 | 13.858 | 4.409 | |
| 31-Jan-01 | 16:37:42 | | | |
| 31-Jan-01 | 16:38:42 | | | |
| 31-Jan-01 | 16:39:42 | | | |
| 31-Jan-01 | 16:40:42 | | | Cal Check |
| 31-Jan-01 | 16:41:42 | | | |
| 31-Jan-01 | 16:42:42 | | | |
| 31-Jan-01 | 16:43:42 | | | |
| 31-Jan-01 | 16:44:42 | | | |
| 31-Jan-01 | 16:45:42 | | | |
| 31-Jan-01 | 16:46:42 | 12.411 | 5.565 | |
| 31-Jan-01 | 16:47:42 | 12.782 | 5.275 | |
| 31-Jan-01 | 16:48:42 | 13.028 | 5.042 | |
| 31-Jan-01 | 16:49:42 | 13.404 | 4.776 | |
| 31-Jan-01 | 16:50:42 | 13.798 | 4.484 | |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-2**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 16:51:42 | 14.074 | 4.255 |
| 31-Jan-01 | 16:52:42 | 14.391 | 4.062 |
| 31-Jan-01 | 16:53:42 | 9.81 | 8.222 |
| 31-Jan-01 | 16:54:42 | 9.805 | 7.702 |
| 31-Jan-01 | 16:55:42 | 9.801 | 7.648 |
| 31-Jan-01 | 16:56:42 | 10.562 | 7.084 |
| 31-Jan-01 | 16:57:42 | 11.329 | 6.505 |
| 31-Jan-01 | 16:58:42 | 11.938 | 6.049 |
| 31-Jan-01 | 16:59:42 | 12.236 | 5.793 |
| 31-Jan-01 | 17:00:42 | 12.407 | 5.653 |
| 31-Jan-01 | | | |
| 31-Jan-01 | 17:02:21 | 11.124 | 7.005 |
| 31-Jan-01 | 17:03:21 | 8.432 | 9.16 |
| 31-Jan-01 | 17:04:21 | 9.374 | 8.09 |
| 31-Jan-01 | 17:05:21 | 9.956 | 7.591 |
| 31-Jan-01 | 17:06:21 | 10.945 | 6.774 |
| 31-Jan-01 | 17:07:21 | 11.587 | 6.287 |
| 31-Jan-01 | 17:08:21 | 12.097 | 5.852 |
| 31-Jan-01 | 17:09:21 | 12.248 | 5.719 |
| 31-Jan-01 | 17:10:21 | 12.336 | 5.642 |
| 31-Jan-01 | 17:11:21 | 12.782 | 5.282 |
| 31-Jan-01 | 17:12:21 | 13.096 | 5.036 |
| 31-Jan-01 | 17:13:21 | 13.166 | 4.967 |
| 31-Jan-01 | 17:14:21 | 10.991 | 7.269 |
| 31-Jan-01 | 17:15:21 | 7.328 | 9.699 |
| 31-Jan-01 | 17:16:21 | 8.221 | 8.861 |
| 31-Jan-01 | 17:17:21 | 10.311 | 7.37 |
| 31-Jan-01 | 17:18:21 | 12.459 | 5.77 |
| 31-Jan-01 | 17:19:21 | 12.763 | 5.363 |
| 31-Jan-01 | 17:20:21 | 13.015 | 5.123 |
| 31-Jan-01 | 17:21:21 | 13.23 | 4.945 |
| 31-Jan-01 | 17:22:21 | 13.551 | 4.705 |
| 31-Jan-01 | 17:23:21 | 14.065 | 4.342 |
| 31-Jan-01 | 17:24:21 | 10.662 | 7.475 |
| 31-Jan-01 | 17:25:21 | 10.297 | 7.304 |
| 31-Jan-01 | 17:26:21 | 11.009 | 6.606 |
| 31-Jan-01 | 17:27:21 | 10.867 | 6.711 |
| 31-Jan-01 | 17:28:21 | 11.458 | 6.26 |
| 31-Jan-01 | 17:29:21 | 11.976 | 5.867 |
| 31-Jan-01 | 17:30:21 | 13.084 | 5.053 |
| 31-Jan-01 | 17:31:21 | 13.52 | 4.713 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-2**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 17:32:21 | 14.007 | 4.373 |
| 31-Jan-01 | 17:33:21 | 13.843 | 4.447 |
| 31-Jan-01 | 17:34:21 | 14.216 | 4.173 |
| 31-Jan-01 | 17:35:21 | 14.486 | 3.963 |
| 31-Jan-01 | 17:36:21 | 14.658 | 3.826 |
| 31-Jan-01 | 17:37:21 | 14.75 | 3.759 |
| 31-Jan-01 | 17:38:21 | 14.852 | 3.67 |
| 31-Jan-01 | 17:39:21 | 14.928 | 3.613 |
| 31-Jan-01 | 17:40:21 | 14.975 | 3.585 |
| 31-Jan-01 | 17:41:21 | 14.94 | 3.617 |
| 31-Jan-01 | 17:42:21 | 12.031 | 6.471 |
| 31-Jan-01 | 17:43:21 | 8.693 | 8.513 |
| 31-Jan-01 | 17:44:21 | 9.304 | 7.907 |
| 31-Jan-01 | 17:45:21 | 11.288 | 6.432 |
| 31-Jan-01 | 17:46:21 | 12.6 | 5.468 |
| 31-Jan-01 | 17:47:21 | 13.098 | 5.039 |
| 31-Jan-01 | 17:48:21 | 13.464 | 4.744 |
| 31-Jan-01 | 17:49:21 | 13.682 | 4.542 |
| 31-Jan-01 | 17:50:21 | 14.071 | 4.275 |
| 31-Jan-01 | 17:51:21 | 14.689 | 3.862 |
| 31-Jan-01 | 17:52:21 | 9.804 | 8.31 |
| 31-Jan-01 | 17:53:21 | 10.491 | 7.174 |
| 31-Jan-01 | 17:54:21 | 11.466 | 6.392 |
| 31-Jan-01 | 17:55:21 | 11.768 | 6.168 |
| 31-Jan-01 | 17:56:21 | 12.659 | 5.469 |
| 31-Jan-01 | 17:57:21 | 12.742 | 5.345 |
| 31-Jan-01 | 17:58:21 | 13.144 | 5.038 |
| 31-Jan-01 | 17:59:21 | 13.244 | 4.925 |
| 31-Jan-01 | 18:00:21 | 13.456 | 4.748 |
| 31-Jan-01 | 18:01:21 | 13.84 | 4.471 |
| 31-Jan-01 | 18:02:21 | 14.093 | 4.292 |
| 31-Jan-01 | 18:03:21 | 14.473 | 4.045 |
| 31-Jan-01 | 18:04:21 | 10.853 | 7.466 |
| 31-Jan-01 | 18:05:21 | 10.612 | 7.12 |
| 31-Jan-01 | 18:06:21 | 11.108 | 6.613 |
| 31-Jan-01 | 18:07:21 | 11.366 | 6.408 |
| 31-Jan-01 | 18:08:21 | 12.341 | 5.642 |
| 31-Jan-01 | 18:09:21 | 12.864 | 5.208 |
| 31-Jan-01 | 18:10:21 | 12.804 | 5.187 |
| 31-Jan-01 | 18:11:21 | 13.256 | 4.841 |
| 31-Jan-01 | 18:12:21 | 13.732 | 4.505 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-2**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 18:13:21 | 14.112 | 4.237 |
| 31-Jan-01 | 18:14:21 | 11.466 | 6.834 |
| 31-Jan-01 | 18:15:21 | 7.967 | 9.059 |
| 31-Jan-01 | 18:16:21 | 8.954 | 8.206 |
| 31-Jan-01 | 18:17:21 | 10.433 | 7.106 |
| 31-Jan-01 | 18:18:21 | 11.703 | 6.15 |
| 31-Jan-01 | 18:19:21 | 12.274 | 5.681 |
| 31-Jan-01 | 18:20:21 | 12.514 | 5.458 |
| 31-Jan-01 | 18:21:21 | 12.944 | 5.144 |
| 31-Jan-01 | 18:22:21 | 13.316 | 4.857 |
| 31-Jan-01 | 18:23:21 | 13.795 | 4.496 |
| 31-Jan-01 | 18:24:21 | 13.879 | 4.411 |
| 31-Jan-01 | 18:25:21 | 11.887 | 6.416 |
| 31-Jan-01 | 18:26:21 | 8.705 | 8.851 |
| 31-Jan-01 | 18:27:21 | 9.937 | 7.551 |
| 31-Jan-01 | 18:28:21 | 10.581 | 6.997 |
| 31-Jan-01 | 18:29:21 | 11.57 | 6.21 |
| 31-Jan-01 | 18:30:21 | 12.434 | 5.607 |
| 31-Jan-01 | 18:31:21 | 12.947 | 5.195 |
| 31-Jan-01 | 18:32:21 | 13.364 | 4.846 |
| 31-Jan-01 | 18:33:21 | 13.671 | 4.581 |
| 31-Jan-01 | 18:34:21 | 14.1 | 4.265 |
| 31-Jan-01 | 18:35:21 | 14.164 | 4.193 |
| 31-Jan-01 | 18:36:21 | 14.485 | 3.965 |
| 31-Jan-01 | 18:37:21 | 14.694 | 3.797 |
| 31-Jan-01 | 18:38:21 | 14.84 | 3.693 |
| 31-Jan-01 | 18:39:21 | 14.978 | 3.636 |
| 31-Jan-01 | 18:40:21 | 9.458 | 8.634 |
| 31-Jan-01 | 18:41:21 | 9.4 | 8.097 |
| 31-Jan-01 | 18:42:21 | 9.748 | 7.732 |
| 31-Jan-01 | 18:43:21 | 10.776 | 6.868 |
| 31-Jan-01 | 18:44:21 | 11.989 | 5.951 |
| 31-Jan-01 | 18:45:21 | 12.714 | 5.406 |
| 31-Jan-01 | 18:46:21 | 13.014 | 5.148 |
| 31-Jan-01 | 18:47:21 | 13.229 | 4.964 |
| 31-Jan-01 | 18:48:21 | 13.152 | 4.989 |
| 31-Jan-01 | 18:49:21 | 12.136 | 6.112 |
| 31-Jan-01 | 18:50:21 | 7.219 | 10.038 |
| 31-Jan-01 | 18:51:21 | 7.664 | 9.392 |
| 31-Jan-01 | 18:52:21 | 9.429 | 8.28 |
| 31-Jan-01 | 18:53:21 | 11.403 | 6.834 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-2**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 18:54:21 | 11.882 | 6.371 |
| 31-Jan-01 | 18:55:21 | 11.692 | 6.383 |
| 31-Jan-01 | 18:56:21 | 11.826 | 6.239 |
| 31-Jan-01 | 18:57:21 | 12.156 | 5.929 |
| 31-Jan-01 | 18:58:21 | 12.321 | 5.787 |
| 31-Jan-01 | 18:59:21 | 12.45 | 5.666 |
| 31-Jan-01 | 19:00:21 | 12.816 | 5.37 |
| 31-Jan-01 | 19:01:21 | 13.087 | 5.209 |
| 31-Jan-01 | 19:02:21 | 8.274 | 9.598 |
| 31-Jan-01 | 19:03:21 | 9.977 | 7.787 |
| 31-Jan-01 | 19:04:21 | 11.253 | 6.646 |
| 31-Jan-01 | 19:05:21 | 11.716 | 6.28 |
| 31-Jan-01 | 19:06:21 | 12.394 | 5.753 |
| 31-Jan-01 | 19:07:21 | 12.829 | 5.391 |
| 31-Jan-01 | 19:08:21 | 13.214 | 5.079 |
| 31-Jan-01 | 19:09:21 | 13.553 | 4.805 |
| 31-Jan-01 | 19:10:21 | 13.663 | 4.695 |
| 31-Jan-01 | 19:11:21 | 13.823 | 4.565 |
| 31-Jan-01 | 19:12:21 | 14.309 | 4.224 |
| 31-Jan-01 | 19:13:21 | 10.581 | 7.677 |
| 31-Jan-01 | 19:14:21 | 9.505 | 8.089 |
| 31-Jan-01 | 19:15:21 | 10.174 | 7.499 |
| 31-Jan-01 | 19:16:21 | 10.977 | 6.83 |
| 31-Jan-01 | 19:17:21 | 11.736 | 6.203 |
| 31-Jan-01 | 19:18:21 | 12.291 | 5.763 |
| 31-Jan-01 | 19:19:21 | 12.589 | 5.501 |
| 31-Jan-01 | 19:20:21 | 13.08 | 5.102 |
| 31-Jan-01 | 19:21:21 | 13.241 | 4.949 |
| 31-Jan-01 | 19:22:21 | 13.502 | 4.761 |
| 31-Jan-01 | 19:23:21 | 13.908 | 4.452 |
| 31-Jan-01 | 19:24:21 | 11.564 | 6.722 |
| 31-Jan-01 | 19:25:21 | 8.584 | 8.748 |
| 31-Jan-01 | 19:26:21 | 9.973 | 7.439 |
| 31-Jan-01 | 19:27:21 | 11.184 | 6.522 |
| 31-Jan-01 | | | |
| 31-Jan-01 | 19:29:31 | 13.399 | 4.836 |
| 31-Jan-01 | 19:30:31 | 13.686 | 4.603 |
| 31-Jan-01 | 19:31:31 | 14.023 | 4.335 |
| 31-Jan-01 | 19:32:31 | 14.344 | 4.098 |
| 31-Jan-01 | 19:33:31 | 14.811 | 3.774 |
| 31-Jan-01 | 19:34:31 | 9.996 | 8.011 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-2**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 19:35:31 | 8.861 | 8.328 |
| 31-Jan-01 | 19:36:31 | 10.395 | 7.09 |
| 31-Jan-01 | 19:37:31 | 11.673 | 6.136 |
| 31-Jan-01 | 19:38:31 | 12.531 | 5.494 |
| 31-Jan-01 | 19:39:31 | 13.025 | 5.123 |
| 31-Jan-01 | 19:40:31 | 13.637 | 4.646 |
| 31-Jan-01 | 19:41:31 | 14.154 | 4.229 |
| 31-Jan-01 | 19:42:31 | 14.488 | 3.958 |
| 31-Jan-01 | 19:43:31 | 14.681 | 3.827 |
| 31-Jan-01 | 19:44:31 | 14.482 | 3.929 |
| 31-Jan-01 | 19:45:31 | 14.65 | 3.818 |
| 31-Jan-01 | 19:46:31 | 14.763 | 3.725 |
| 31-Jan-01 | 19:47:31 | 13.48 | 5.136 |
| 31-Jan-01 | 19:48:31 | 10.616 | 7.368 |
| 31-Jan-01 | 19:49:31 | 9.963 | 7.554 |
| 31-Jan-01 | 19:50:31 | 9.083 | 8.168 |
| 31-Jan-01 | 19:51:31 | 10.554 | 7.018 |
| 31-Jan-01 | 19:52:31 | 11.621 | 6.196 |
| 31-Jan-01 | 19:53:31 | 12.34 | 5.642 |
| 31-Jan-01 | 19:54:31 | 12.604 | 5.438 |
| 31-Jan-01 | 19:55:31 | 12.937 | 5.156 |
| 31-Jan-01 | 19:56:31 | 13.312 | 4.863 |
| 31-Jan-01 | 19:57:31 | 11.965 | 6.191 |
| 31-Jan-01 | 19:58:31 | 9.017 | 8.68 |
| 31-Jan-01 | 19:59:31 | 10.349 | 7.241 |
| 31-Jan-01 | 20:00:31 | 10.987 | 6.671 |
| 31-Jan-01 | 20:01:31 | 11.524 | 6.265 |
| 31-Jan-01 | 20:02:31 | 11.797 | 6.051 |
| 31-Jan-01 | 20:03:31 | 12.178 | 5.749 |
| 31-Jan-01 | 20:04:31 | 12.3 | 5.646 |
| 31-Jan-01 | 20:05:31 | 12.499 | 5.474 |
| 31-Jan-01 | 20:06:31 | 12.466 | 5.508 |
| 31-Jan-01 | 20:07:31 | 9.349 | 8.619 |
| 31-Jan-01 | 20:08:31 | 10.128 | 7.439 |
| 31-Jan-01 | 20:09:31 | 10.879 | 6.711 |
| 31-Jan-01 | 20:10:31 | 11.749 | 6.062 |
| 31-Jan-01 | 20:11:31 | 12.654 | 5.395 |
| 31-Jan-01 | 20:12:31 | 13.087 | 5.03 |
| 31-Jan-01 | 20:13:31 | 13.271 | 4.88 |
| 31-Jan-01 | 20:14:31 | 13.468 | 4.719 |
| 31-Jan-01 | 20:15:31 | 13.586 | 4.615 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-2**

| Date | Time | O2 | CO2 | |
|---|---|---|---|---|
| 31-Jan-01 | 20:16:31 | 11.945 | 6.43 | |
| 31-Jan-01 | 20:17:31 | 9.95 | 7.911 | |
| 31-Jan-01 | 20:18:31 | 10.619 | 7.092 | |
| 31-Jan-01 | 20:19:31 | 10.632 | 7.096 | |
| 31-Jan-01 | 20:20:31 | 11.807 | 6.171 | |
| 31-Jan-01 | 20:21:31 | 12.609 | 5.507 | |
| 31-Jan-01 | 20:22:31 | 12.945 | 5.209 | |
| 31-Jan-01 | 20:23:31 | 13.196 | 5.008 | |
| 31-Jan-01 | 20:24:31 | 13.467 | 4.789 | |
| 31-Jan-01 | 20:25:31 | 13.365 | 4.856 | |
| 31-Jan-01 | 20:26:31 | 14.008 | 4.406 | |
| 31-Jan-01 | 20:27:31 | 10.33 | 7.846 | |
| 31-Jan-01 | 20:28:31 | 10.006 | 7.474 | |
| 31-Jan-01 | 20:29:31 | 11.794 | 7.05 | |
| 31-Jan-01 | 20:30:31 | | | |
| 31-Jan-01 | 20:31:31 | | | |
| 31-Jan-01 | 20:32:31 | | | |
| 31-Jan-01 | 20:34:00 | | | |
| 31-Jan-01 | 20:35:00 | | | Cal Check |
| 31-Jan-01 | 20:36:00 | | | |
| 31-Jan-01 | 20:37:00 | | | |
| 31-Jan-01 | 20:38:00 | | | |
| 31-Jan-01 | 20:39:00 | | | |
| 31-Jan-01 | 20:40:00 | | | |

| | | | |
|---|---|---|---|
| Average | M23-2 | 12.2 | 5.9 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 1/101 | 9:10:00 | 12.832 | 5.33 |
| 2/ 1/101 | 9:11:00 | 13.373 | 4.869 |
| 2/ 1/101 | 9:12:00 | 13.966 | 4.419 |
| 2/ 1/101 | 9:13:00 | 14.29 | 4.17 |
| 2/ 1/101 | 9:14:00 | 14.513 | 3.989 |
| 2/ 1/101 | 9:15:00 | 13.408 | 4.554 |
| 2/ 1/101 | 9:16:00 | 13.451 | 4.574 |
| 2/ 1/101 | 9:17:00 | 10.678 | 7.566 |
| 2/ 1/101 | 9:18:00 | 9.866 | 7.777 |
| 2/ 1/101 | 9:19:00 | 9.84 | 7.612 |
| 2/ 1/101 | 9:20:00 | 10.2 | 7.443 |
| 2/ 1/101 | 9:21:00 | 12.279 | 5.749 |
| 2/ 1/101 | 9:22:00 | 12.997 | 5.158 |
| 2/ 1/101 | 9:23:00 | 13.609 | 4.676 |
| 2/ 1/101 | 9:24:00 | 13.882 | 4.425 |
| 2/ 1/101 | 9:25:00 | 13.991 | 4.314 |
| 2/ 1/101 | 9:26:00 | 14.214 | 4.142 |
| 2/ 1/101 | 9:27:00 | 14.517 | 3.902 |
| 2/ 1/101 | 9:28:00 | 13.94 | 4.221 |
| 2/ 1/101 | 9:29:00 | 13.846 | 4.275 |
| 2/ 1/101 | 9:30:00 | 14.453 | 3.941 |
| 2/ 1/101 | 9:31:00 | 10.26 | 7.872 |
| 2/ 1/101 | 9:32:00 | 9.142 | 8.036 |
| 2/ 1/101 | 9:33:00 | 8.592 | 8.282 |
| 2/ 1/101 | 9:34:00 | 10.308 | 7.231 |
| 2/ 1/101 | 9:35:00 | 12.22 | 5.866 |
| 2/ 1/101 | 9:36:00 | 12.845 | 5.333 |
| 2/ 1/101 | 9:37:00 | 13.379 | 4.882 |
| 2/ 1/101 | 9:38:00 | 13.968 | 4.387 |
| 2/ 1/101 | 9:39:00 | 14.439 | 4.032 |
| 2/ 1/101 | 9:40:00 | 14.248 | 4.416 |
| 2/ 1/101 | 9:41:00 | 10.234 | 7.878 |
| 2/ 1/101 | 9:42:00 | 11.043 | 6.824 |
| 2/ 1/101 | 9:43:00 | 9.472 | 7.999 |
| 2/ 1/101 | 9:44:00 | 10.376 | 7.322 |
| 2/ 1/101 | 9:45:00 | 11.534 | 6.376 |
| 2/ 1/101 | 9:46:00 | 12.437 | 5.668 |
| 2/ 1/101 | 9:47:00 | 13.16 | 5.079 |
| 2/ 1/101 | 9:48:00 | 13.625 | 4.721 |
| 2/ 1/101 | 9:49:00 | 14.316 | 4.246 |
| 2/ 1/101 | 9:50:00 | 10.638 | 7.819 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-3**

| Date | Time | O2 | CO2 | | |
|---|---|---|---|---|---|
| 2/ 1/101 | 9:51:00 | 10.535 | 7.33 | | |
| 2/ 1/101 | 9:52:00 | 8.936 | 8.458 | | |
| 2/ 1/101 | 9:53:00 | 8.673 | 8.738 | | |
| 2/ 1/101 | 9:54:00 | 10.017 | 7.619 | | |
| 2/ 1/101 | 9:55:00 | 10.574 | 7.152 | | |
| 2/ 1/101 | 9:56:00 | 10.951 | 6.871 | | |
| 2/ 1/101 | 9:57:00 | 11.449 | 6.484 | | |
| 2/ 1/101 | 9:58:00 | 11.642 | 6.299 | | |
| 2/ 1/101 | 9:59:00 | 12.154 | 5.916 | | |
| 2/ 1/101 | 10:00:00 | 12.566 | 5.554 | | |
| 2/ 1/101 | 10:01:00 | 10.903 | 7.365 | | |
| 2/ 1/101 | 10:02:00 | 8.964 | 8.744 | | |
| 2/ 1/101 | 10:03:00 | 9.559 | 8.092 | | |
| 2/ 1/101 | 10:04:00 | 9.668 | 7.908 | | |
| 2/ 1/101 | 10:05:00 | 10.545 | 7.141 | | |
| 2/ 1/101 | 10:06:00 | 11.244 | 6.566 | | |
| 2/ 1/101 | 10:07:00 | 11.936 | 6.043 | | |
| 2/ 1/101 | 10:08:00 | 12.305 | 5.788 | | |
| 2/ 1/101 | 10:09:00 | 12.52 | 5.593 | | |
| 2/ 1/101 | 10:10:00 | 12.909 | 5.275 | M26-3 Average | 11.9 |
| 2/ 1/101 | 10:11:00 | 13.475 | 4.902 | | |
| 2/ 1/101 | 10:12:00 | 9.177 | 8.761 | | |
| 2/ 1/101 | 10:13:00 | 8.577 | 8.649 | | |
| 2/ 1/101 | 10:14:00 | 9.085 | 8.282 | | |
| 2/ 1/101 | 10:15:00 | 10.279 | 7.375 | | |
| 2/ 1/101 | 10:16:00 | | | Cal Check | |
| 2/ 1/101 | 10:17:00 | | | | |
| 2/ 1/101 | 10:18:00 | | | | |
| 2/ 1/101 | 10:19:00 | | | | |
| 2/ 1/101 | 10:20:00 | | | | |
| 2/ 1/101 | 10:21:00 | | | | |
| 2/ 1/101 | 10:22:00 | | | | |
| 2/ 1/101 | 10:23:00 | | | | |
| 2/ 1/101 | 10:24:00 | | | | |
| 2/ 1/101 | 10:25:00 | | | | |
| 2/ 1/101 | 10:26:00 | | | | |
| 2/ 1/101 | 10:27:00 | | | | |
| 2/ 1/101 | 10:28:00 | | | | |
| 2/ 1/101 | 10:29:00 | | | | |
| 2/ 1/101 | 10:30:00 | | | | |
| 2/ 1/101 | 10:31:00 | | | | |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 1/101 | 10:32:00 | | |
| 2/ 1/101 | 10:33:00 | | |
| 2/ 1/101 | 10:34:00 | | |
| 2/ 1/101 | 10:35:00 | | |
| 2/ 1/101 | 10:36:00 | | |
| 2/ 1/101 | 10:37:00 | 12.878 | 10.19 |
| 2/ 1/101 | 10:38:00 | 15.437 | 8.115 |
| 2/ 1/101 | 10:39:00 | 11.785 | 6.203 |
| 2/ 1/101 | 10:40:00 | 12.042 | 6.019 |
| 2/ 1/101 | 10:41:00 | 12.564 | 5.612 |
| 2/ 1/101 | 10:42:00 | 12.63 | 5.56 |
| 2/ 1/101 | 10:43:00 | 13.289 | 5.076 |
| 2/ 1/101 | 10:44:00 | 10.305 | 7.95 |
| 2/ 1/101 | 10:45:00 | 8.945 | 8.683 |
| 2/ 1/101 | 10:46:00 | 9.727 | 7.897 |
| 2/ 1/101 | 10:47:00 | 10.6 | 7.177 |
| 2/ 1/101 | 10:48:00 | 11.646 | 6.379 |
| 2/ 1/101 | 10:49:00 | 12.215 | 5.94 |
| 2/ 1/101 | 10:50:00 | 12.597 | 5.642 |
| 2/ 1/101 | 10:51:00 | 12.665 | 5.577 |
| 2/ 1/101 | 10:52:00 | 12.924 | 5.355 |
| 2/ 1/101 | 10:53:00 | 13.463 | 4.988 |
| 2/ 1/101 | 10:54:00 | 9.969 | 8.326 |
| 2/ 1/101 | 10:55:00 | 9.096 | 8.671 |
| 2/ 1/101 | 10:56:00 | 10.469 | 7.507 |
| 2/ 1/101 | 10:57:00 | 11.319 | 6.751 |
| 2/ 1/101 | 10:58:00 | 12.158 | 6.073 |
| 2/ 1/101 | 10:59:00 | 12.506 | 5.768 |
| 2/ 1/101 | 11:00:00 | 12.869 | 5.43 |
| 2/ 1/101 | 11:01:00 | 13.481 | 4.946 |
| 2/ 1/101 | 11:02:00 | 13.759 | 4.688 |
| 2/ 1/101 | 11:03:00 | 13.836 | 4.641 |
| 2/ 1/101 | 11:04:00 | 10.62 | 7.743 |
| 2/ 1/101 | 11:05:00 | 6.191 | 10.729 |
| 2/ 1/101 | 11:06:00 | 10.01 | 7.683 |
| 2/ 1/101 | 11:07:00 | 11.518 | 6.523 |
| 2/ 1/101 | 11:08:00 | 12.299 | 5.897 |
| 2/ 1/101 | 11:09:00 | 12.537 | 5.683 |
| 2/ 1/101 | 11:10:00 | 12.884 | 5.396 |
| 2/ 1/101 | 11:11:00 | 13.218 | 5.137 |
| 2/ 1/101 | 11:12:00 | 13.494 | 4.911 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M23-3**

| Date | Time | O2 | CO2 | |
|---|---|---|---|---|
| 2/ 1/101 | 11:13:00 | 13.805 | 4.689 | |
| 2/ 1/101 | 11:14:00 | 14.098 | 4.486 | |
| 2/ 1/101 | 11:15:00 | 13.186 | 5.444 | |
| 2/ 1/101 | 11:16:00 | 9.176 | 8.904 | |
| 2/ 1/101 | 11:17:00 | 11.267 | 6.771 | |
| 2/ 1/101 | 11:18:00 | 11.588 | 6.419 | |
| 2/ 1/101 | 11:19:00 | 12.523 | 5.703 | |
| 2/ 1/101 | 11:20:00 | 12.933 | 5.366 | |
| 2/ 1/101 | 11:21:00 | 13.341 | 5.052 | |
| 2/ 1/101 | 11:22:00 | 13.693 | 4.788 | |
| 2/ 1/101 | 11:23:00 | 13.854 | 4.649 | |
| 2/ 1/101 | 11:24:00 | 14.074 | 4.477 | |
| 2/ 1/101 | 11:25:00 | 14.241 | 4.344 | |
| 2/ 1/101 | 11:26:00 | 14.573 | 4.173 | |
| 2/ 1/101 | 11:27:00 | 9.687 | 8.461 | |
| 2/ 1/101 | 11:28:00 | 8.1 | 9.214 | |
| 2/ 1/101 | 11:29:00 | 9.455 | 8.134 | |
| 2/ 1/101 | 11:30:00 | 10.169 | 7.642 | |
| 2/ 1/101 | 11:31:00 | 11.088 | 6.935 | |
| 2/ 1/101 | 11:32:00 | 11.505 | 6.614 | |
| 2/ 1/101 | 11:33:00 | 11.613 | 6.505 | |
| 2/ 1/101 | 11:34:00 | 11.614 | 6.492 | |
| 2/ 1/101 | 11:35:00 | 11.974 | 6.215 | |
| 2/ 1/101 | 11:36:00 | 12.005 | 6.178 | |
| 2/ 1/101 | 11:37:00 | 12.393 | 5.877 | |
| 2/ 1/101 | 11:38:00 | 12.308 | 5.9 | |
| 2/ 1/101 | 11:39:00 | 12.506 | 5.751 | |
| 2/ 1/101 | 11:40:00 | 12.946 | 5.407 | |
| 2/ 1/101 | 11:41:00 | 13.334 | 5.102 | |
| 2/ 1/101 | 11:42:00 | 13.596 | 4.895 | |
| 2/ 1/101 | 11:43:00 | | | Cal check |
| 2/ 1/101 | 11:44:00 | | | |
| 2/ 1/101 | 11:45:00 | | | |
| 2/ 1/101 | 11:46:00 | | | |
| 2/ 1/101 | 11:47:00 | | | |
| 2/ 1/101 | 11:48:00 | | | |
| 2/ 1/101 | 11:49:00 | | | |
| 2/ 1/101 | 11:50:00 | | | |
| 2/ 1/101 | 11:51:00 | | | |
| 2/ 1/101 | 11:52:00 | | | |
| 2/ 1/101 | 11:53:00 | | | |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 1/101 | 11:54:00 | | |
| 2/ 1/101 | 11:55:00 | | |
| 2/ 1/101 | 11:56:00 | | |
| 2/ 1/101 | 11:57:00 | | |
| 2/ 1/101 | 11:58:00 | | |
| 2/ 1/101 | 11:59:00 | | |
| 2/ 1/101 | 12:00:00 | 12.137 | 9.942 |
| 2/ 1/101 | 12:01:00 | 12.143 | 9.954 |
| 2/ 1/101 | 12:02:00 | 12.146 | 9.963 |
| 2/ 1/101 | 12:03:00 | 12.15 | 9.978 |
| 2/ 1/101 | 12:04:00 | 12.154 | 9.983 |
| 2/ 1/101 | 12:05:00 | 12.159 | 9.989 |
| 2/ 1/101 | 12:06:00 | 12.16 | 10.002 |
| 2/ 1/101 | 12:07:00 | 11.257 | 8.915 |
| 2/ 1/101 | 12:08:00 | 10.168 | 7.656 |
| 2/ 1/101 | 12:09:00 | 10.95 | 7.008 |
| 2/ 1/101 | 12:10:00 | 11.835 | 6.326 |
| 2/ 1/101 | 12:11:00 | 12.539 | 5.76 |
| 2/ 1/101 | 12:12:00 | 12.933 | 5.435 |
| 2/ 1/101 | 12:13:00 | 13.227 | 5.167 |
| 2/ 1/101 | 12:14:00 | 13.667 | 4.81 |
| 2/ 1/101 | 12:15:00 | 13.788 | 4.706 |
| 2/ 1/101 | 12:16:00 | 14.031 | 4.536 |
| 2/ 1/101 | 12:17:00 | 11.588 | 7.121 |
| 2/ 1/101 | 12:18:00 | 10.083 | 7.839 |
| | | | |
| 2/ 1/101 | 12:19:29 | 11.206 | 6.727 |
| 2/ 1/101 | 12:20:29 | 12.101 | 6.049 |
| 2/ 1/101 | 12:21:29 | 13.215 | 5.192 |
| 2/ 1/101 | 12:22:29 | 13.592 | 4.891 |
| 2/ 1/101 | 12:23:29 | 14.004 | 4.546 |
| 2/ 1/101 | 12:24:29 | 14.23 | 4.381 |
| 2/ 1/101 | 12:25:29 | 14.516 | 4.178 |
| 2/ 1/101 | 12:26:29 | 14.943 | 3.923 |
| 2/ 1/101 | 12:27:29 | 10.235 | 8.31 |
| 2/ 1/101 | 12:28:29 | 11.381 | 6.825 |
| 2/ 1/101 | 12:29:29 | 11.542 | 6.538 |
| 2/ 1/101 | 12:30:29 | 11.738 | 6.358 |
| 2/ 1/101 | 12:31:29 | 12.576 | 5.688 |
| 2/ 1/101 | 12:32:29 | 13.078 | 5.288 |
| 2/ 1/101 | 12:33:29 | 13.652 | 4.834 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 1/101 | 12:34:29 | 13.947 | 4.603 |
| 2/ 1/101 | 12:35:29 | 14.347 | 4.323 |
| 2/ 1/101 | 12:36:29 | 14.64 | 4.091 |
| 2/ 1/101 | 12:37:29 | 14.511 | 4.325 |
| 2/ 1/101 | 12:38:29 | 9.614 | 8.613 |
| 2/ 1/101 | 12:39:29 | 9.201 | 8.442 |
| 2/ 1/101 | 12:40:29 | 9.453 | 8.197 |
| 2/ 1/101 | 12:41:29 | 10.643 | 7.267 |
| 2/ 1/101 | 12:42:29 | 11.428 | 6.624 |
| 2/ 1/101 | 12:43:29 | 11.791 | 6.321 |
| 2/ 1/101 | 12:44:29 | 12.191 | 6.02 |
| 2/ 1/101 | 12:45:29 | 12.961 | 5.435 |
| 2/ 1/101 | 12:46:29 | 13.6 | 4.94 |
| 2/ 1/101 | 12:47:29 | 13.781 | 4.746 |
| 2/ 1/101 | 12:48:29 | 14.249 | 4.423 |
| 2/ 1/101 | 12:49:29 | 14.535 | 4.212 |
| 2/ 1/101 | 12:50:29 | 14.724 | 4.071 |
| 2/ 1/101 | 12:51:29 | 14.934 | 3.898 |
| 2/ 1/101 | 12:52:29 | 14.969 | 3.842 |
| 2/ 1/101 | 12:53:29 | 14.979 | 3.871 |
| 2/ 1/101 | 12:54:29 | 12.102 | 6.74 |
| 2/ 1/101 | 12:55:29 | 7.532 | 9.453 |
| 2/ 1/101 | 12:56:29 | 6.595 | 10.288 |
| 2/ 1/101 | 12:57:29 | 9.149 | 8.485 |
| 2/ 1/101 | 12:58:29 | 11.267 | 6.889 |
| 2/ 1/101 | 12:59:29 | 11.513 | 6.646 |
| 2/ 1/101 | 13:00:29 | 11.824 | 6.325 |
| 2/ 1/101 | 13:01:29 | 11.852 | 6.281 |
| 2/ 1/101 | 13:02:29 | 12.271 | 5.962 |
| 2/ 1/101 | 13:03:29 | 12.545 | 5.801 |
| 2/ 1/101 | 13:04:29 | 7.915 | 9.943 |
| 2/ 1/101 | 13:05:29 | 7.933 | 9.476 |
| 2/ 1/101 | 13:06:29 | 10.095 | 7.887 |
| 2/ 1/101 | 13:07:29 | 11.466 | 6.831 |
| 2/ 1/101 | 13:08:29 | 12.128 | 6.236 |
| 2/ 1/101 | 13:09:29 | 12.243 | 6.052 |
| 2/ 1/101 | 13:10:29 | 12.46 | 5.851 |
| 2/ 1/101 | 13:11:29 | 12.75 | 5.625 |
| 2/ 1/101 | 13:12:29 | 13.198 | 5.272 |
| 2/ 1/101 | 13:13:29 | 13.126 | 5.316 |
| 2/ 1/101 | 13:14:29 | 13.437 | 5.067 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M23-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 1/101 | 13:15:29 | 13.82 | 4.778 |
| 2/ 1/101 | 13:16:29 | 14.073 | 4.581 |
| 2/ 1/101 | 13:17:29 | 14.328 | 4.386 |
| 2/ 1/101 | 13:18:29 | 14.566 | 4.204 |
| 2/ 1/101 | 13:19:29 | 14.35 | 4.334 |
| 2/ 1/101 | 13:20:29 | 14.645 | 4.135 |
| 2/ 1/101 | 13:21:29 | 14.811 | 3.993 |
| 2/ 1/101 | 13:22:29 | 14.913 | 3.933 |
| 2/ 1/101 | 13:23:29 | 15.023 | 3.85 |
| 2/ 1/101 | 13:24:29 | 15.111 | 3.781 |
| 2/ 1/101 | 13:25:29 | 15.172 | 3.739 |
| 2/ 1/101 | 13:26:29 | 15.246 | 3.676 |
| 2/ 1/101 | 13:27:29 | 15.318 | 3.633 |
| 2/ 1/101 | 13:28:29 | 15.34 | 3.603 |
| 2/ 1/101 | 13:29:29 | 14.024 | 4.357 |
| 2/ 1/101 | 13:30:29 | 13.709 | 4.563 |
| Average | M23-3 | 12.2 | 6.2 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M26-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 10:45 | 12.0 | 5.6 |
| 31-Jan-01 | 10:46 | 12.5 | 5.6 |
| 31-Jan-01 | 10:47 | 12.5 | 4.8 |
| 31-Jan-01 | 10:48 | 13.0 | 4.8 |
| 31-Jan-01 | 10:49 | 13.3 | 4.0 |
| 31-Jan-01 | 10:50 | 13.5 | 8.8 |
| 31-Jan-01 | 10:51 | 9.3 | 8.0 |
| 31-Jan-01 | 10:52 | 9.5 | 8.0 |
| 31-Jan-01 | 10:53 | 10.0 | 7.2 |
| 31-Jan-01 | 10:54 | 11.3 | 5.2 |
| 31-Jan-01 | 10:55 | 12.8 | 4.8 |
| 31-Jan-01 | 10:56 | 13.0 | 4.8 |
| 31-Jan-01 | 10:57 | 8.8 | 8.0 |
| 31-Jan-01 | 10:58 | 9.8 | 8.4 |
| 31-Jan-01 | 10:59 | 10.8 | 8.8 |
| 31-Jan-01 | 11:00 | 10.8 | 8.8 |
| 31-Jan-01 | 11:01 | 12.0 | 8.4 |
| 31-Jan-01 | 11:02 | 12.8 | 8.0 |
| 31-Jan-01 | 11:03 | 13.3 | 8.0 |
| 31-Jan-01 | 11:04 | 13.5 | 7.2 |
| 31-Jan-01 | 11:05 | 13.8 | 6.8 |
| 31-Jan-01 | 11:06 | 14.0 | 6.4 |
| 31-Jan-01 | 11:07 | 14.0 | 6.0 |
| 31-Jan-01 | 11:08 | 15.0 | 5.6 |
| 31-Jan-01 | 11:09 | 10.3 | 5.2 |
| 31-Jan-01 | 11:10 | 11.0 | 4.8 |
| 31-Jan-01 | 11:11 | 9.3 | 5.2 |
| 31-Jan-01 | 11:12 | 11.8 | 5.6 |
| 31-Jan-01 | 11:13:15 | 10.055 | 5.659 |
| 31-Jan-01 | 11:14:15 | 10.784 | 5.529 |
| 31-Jan-01 | 11:15:15 | 10.336 | 5.245 |
| 31-Jan-01 | 11:16:15 | 10.981 | 5.02 |
| 31-Jan-01 | 11:17:15 | 12.067 | 4.993 |
| 31-Jan-01 | 11:18:15 | 12.374 | 5.198 |
| 31-Jan-01 | 11:19:15 | 12.5 | 5.507 |
| 31-Jan-01 | 11:20:15 | 12.865 | 5.801 |
| 31-Jan-01 | 11:21:15 | 13.414 | 6.02 |
| 31-Jan-01 | 11:22:15 | 13.929 | 6.115 |
| 31-Jan-01 | 11:23:15 | 9.623 | 6.085 |
| 31-Jan-01 | 11:24:15 | 8.689 | 6.001 |
| 31-Jan-01 | 11:25:15 | 10.295 | 5.856 |

## Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

**M26-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 31-Jan-01 | 11:26:15 | 9.827 | 5.673 |
| 31-Jan-01 | 11:27:15 | 10.649 | 5.545 |
| 31-Jan-01 | 11:28:15 | 11.78 | 5.621 |
| 31-Jan-01 | 11:29:00 | 11 | 6 |
| 31-Jan-01 | 11:30:00 | 11.75 | 6 |
| 31-Jan-01 | 11:31:00 | 12.25 | 6.4 |
| 31-Jan-01 | 11:32:00 | 12.5 | 6.4 |
| 31-Jan-01 | 11:33:00 | 13 | 6.4 |
| 31-Jan-01 | 11:34:00 | 13.75 | 6.4 |
| 31-Jan-01 | 11:35:00 | 13.5 | 6.4 |
| 31-Jan-01 | 11:36:00 | 9.25 | 6.4 |
| 31-Jan-01 | 11:37:00 | 10 | 6.4 |
| 31-Jan-01 | 11:38:00 | 9.5 | 6 |
| 31-Jan-01 | 11:39:00 | 10.5 | 6.4 |
| 31-Jan-01 | 11:40:00 | 12 | 6.4 |
| 31-Jan-01 | 11:41:45 | 13.415 | 6.409 |
| 31-Jan-01 | 11:42:45 | 13.613 | 6.541 |
| 31-Jan-01 | 11:43:45 | 10.964 | 6.566 |
| 31-Jan-01 | 11:44:45 | 9.35 | 6.505 |
| Average( | | 11.7 | 6.2 |

## Malcolm Grow Medical Center - Andrews AFB, MD

### Medical Waste Incinerator

CEM Responses

**M26-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 1/101 | 9:10:00 | 12.832 | 5.33 |
| 2/ 1/101 | 9:11:00 | 13.373 | 4.869 |
| 2/ 1/101 | 9:12:00 | 13.966 | 4.419 |
| 2/ 1/101 | 9:13:00 | 14.29 | 4.17 |
| 2/ 1/101 | 9:14:00 | 14.513 | 3.989 |
| 2/ 1/101 | 9:15:00 | 13.408 | 4.554 |
| 2/ 1/101 | 9:16:00 | 13.451 | 4.574 |
| 2/ 1/101 | 9:17:00 | 10.678 | 7.566 |
| 2/ 1/101 | 9:18:00 | 9.866 | 7.777 |
| 2/ 1/101 | 9:19:00 | 9.84 | 7.612 |
| 2/ 1/101 | 9:20:00 | 10.2 | 7.443 |
| 2/ 1/101 | 9:21:00 | 12.279 | 5.749 |
| 2/ 1/101 | 9:22:00 | 12.997 | 5.158 |
| 2/ 1/101 | 9:23:00 | 13.609 | 4.676 |
| 2/ 1/101 | 9:24:00 | 13.882 | 4.425 |
| 2/ 1/101 | 9:25:00 | 13.991 | 4.314 |
| 2/ 1/101 | 9:26:00 | 14.214 | 4.142 |
| 2/ 1/101 | 9:27:00 | 14.517 | 3.902 |
| 2/ 1/101 | 9:28:00 | 13.94 | 4.221 |
| 2/ 1/101 | 9:29:00 | 13.846 | 4.275 |
| 2/ 1/101 | 9:30:00 | 14.453 | 3.941 |
| 2/ 1/101 | 9:31:00 | 10.26 | 7.872 |
| 2/ 1/101 | 9:32:00 | 9.142 | 8.036 |
| 2/ 1/101 | 9:33:00 | 8.592 | 8.282 |
| 2/ 1/101 | 9:34:00 | 10.308 | 7.231 |
| 2/ 1/101 | 9:35:00 | 12.22 | 5.866 |
| 2/ 1/101 | 9:36:00 | 12.845 | 5.333 |
| 2/ 1/101 | 9:37:00 | 13.379 | 4.882 |
| 2/ 1/101 | 9:38:00 | 13.968 | 4.387 |
| 2/ 1/101 | 9:39:00 | 14.439 | 4.032 |
| 2/ 1/101 | 9:40:00 | 14.248 | 4.416 |
| 2/ 1/101 | 9:41:00 | 10.234 | 7.878 |
| 2/ 1/101 | 9:42:00 | 11.043 | 6.824 |
| 2/ 1/101 | 9:43:00 | 9.472 | 7.999 |
| 2/ 1/101 | 9:44:00 | 10.376 | 7.322 |
| 2/ 1/101 | 9:45:00 | 11.534 | 6.376 |
| 2/ 1/101 | 9:46:00 | 12.437 | 5.668 |
| 2/ 1/101 | 9:47:00 | 13.16 | 5.079 |
| 2/ 1/101 | 9:48:00 | 13.625 | 4.721 |
| 2/ 1/101 | 9:49:00 | 14.316 | 4.246 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M26-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 1/101 | 9:50:00 | 10.638 | 7.819 |
| 2/ 1/101 | 9:51:00 | 10.535 | 7.33 |
| 2/ 1/101 | 9:52:00 | 8.936 | 8.458 |
| 2/ 1/101 | 9:53:00 | 8.673 | 8.738 |
| 2/ 1/101 | 9:54:00 | 10.017 | 7.619 |
| 2/ 1/101 | 9:55:00 | 10.574 | 7.152 |
| 2/ 1/101 | 9:56:00 | 10.951 | 6.871 |
| 2/ 1/101 | 9:57:00 | 11.449 | 6.484 |
| 2/ 1/101 | 9:58:00 | 11.642 | 6.299 |
| 2/ 1/101 | 9:59:00 | 12.154 | 5.916 |
| 2/ 1/101 | 10:00:00 | 12.566 | 5.554 |
| 2/ 1/101 | 10:01:00 | 10.903 | 7.365 |
| 2/ 1/101 | 10:02:00 | 8.964 | 8.744 |
| 2/ 1/101 | 10:03:00 | 9.559 | 8.092 |
| 2/ 1/101 | 10:04:00 | 9.668 | 7.908 |
| 2/ 1/101 | 10:05:00 | 10.545 | 7.141 |
| 2/ 1/101 | 10:06:00 | 11.244 | 6.566 |
| 2/ 1/101 | 10:07:00 | 11.936 | 6.043 |
| 2/ 1/101 | 10:08:00 | 12.305 | 5.788 |
| 2/ 1/101 | 10:09:00 | 12.52 | 5.593 |
| Average | | 11.93 | 6.08 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M26-4**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2-Feb-01 | 9:45:00 | 13.314 | 5.328 |
| 2-Feb-01 | 9:46:00 | 10.023 | 7.636 |
| 2-Feb-01 | 9:47:00 | 9.985 | 7.295 |
| 2-Feb-01 | 9:48:00 | 7.953 | 9.017 |
| 2-Feb-01 | 9:49:00 | 11.025 | 6.729 |
| 2-Feb-01 | 9:50:00 | 12.542 | 5.567 |
| 2-Feb-01 | 9:51:00 | 13.149 | 5.055 |
| 2-Feb-01 | 9:52:00 | 13.659 | 4.666 |
| 2-Feb-01 | 9:53:00 | 13.887 | 4.462 |
| 2-Feb-01 | 9:54:00 | 14.0 | 4.8 |
| 2-Feb-01 | 9:55:00 | 14.3 | 4.8 |
| 2-Feb-01 | 9:56:00 | 14.4 | 4.4 |
| 2-Feb-01 | 9:57:00 | 13.8 | 7.6 |
| 2-Feb-01 | 9:58:00 | 13.8 | 9.6 |
| 2-Feb-01 | 9:59:00 | 10.0 | 8.0 |
| 2-Feb-01 | 10:00:00 | 10.0 | 6.4 |
| 2-Feb-01 | 10:01:00 | 10.3 | 5.2 |
| 2-Feb-01 | 10:02:00 | 10.5 | 4.8 |
| 2-Feb-01 | 10:03:00 | 12.0 | 4.4 |
| 2-Feb-01 | 10:04:00 | 12.8 | 6.0 |
| 2-Feb-01 | 10:05:00 | 13.5 | 10.4 |
| 2-Feb-01 | 10:06:00 | 14.0 | 8.4 |
| 2-Feb-01 | 10:07:00 | 13.8 | 6.4 |
| 2-Feb-01 | 10:08:00 | 6.5 | 6.4 |
| 2-Feb-01 | 10:09:00 | 10.8 | 6.0 |
| 2-Feb-01 | 10:10:00 | 11.8 | 5.6 |
| 2-Feb-01 | 10:11:00 | 12.0 | 5.2 |
| 2-Feb-01 | 10:12:00 | 12.0 | 8.0 |
| 2-Feb-01 | 10:13:00 | 12.3 | 8.0 |
| 2-Feb-01 | 10:14:00 | 13.0 | 7.6 |
| 2-Feb-01 | 10:15:00 | 13.5 | 8.4 |
| 2-Feb-01 | 10:16:00 | 13.3 | 6.8 |
| 2-Feb-01 | 10:17:00 | 10.0 | 6.8 |
| 2-Feb-01 | 10:18:00 | 10.3 | 6.4 |
| 2-Feb-01 | 10:19:00 | 8.3 | 6.4 |
| 2-Feb-01 | 10:20:00 | 10.8 | 6.0 |
| 2-Feb-01 | 10:21:00 | 11.0 | 6.0 |
| 2-Feb-01 | 10:22:00 | 11.5 | 5.6 |
| 2-Feb-01 | 10:23:00 | 11.5 | 4.8 |
| 2-Feb-01 | 10:24:00 | 12.0 | 9.2 |

## Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

**M26-4**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2-Feb-01 | 10:25:00 | 12.3 | 7.2 |
| 2-Feb-01 | 10:26:00 | 12.5 | 8.0 |
| 2-Feb-01 | 10:27:00 | 8.3 | 7.2 |
| 2-Feb-01 | 10:28:00 | 9.8 | 5.2 |
| 2-Feb-01 | 10:29:00 | 9.5 | 4.8 |
| 2-Feb-01 | 10:30:00 | 10.3 | 8.8 |
| 2-Feb-01 | 10:31:00 | 11.0 | 9.6 |
| 2-Feb-01 | 10:32:00 | 12.5 | 8.8 |
| 2-Feb-01 | 10:33:00 | 8.5 | 8.0 |
| 2-Feb-01 | 10:34:00 | 6.8 | 6.8 |
| 2-Feb-01 | 10:35:00 | 9.0 | 6.0 |
| 2-Feb-01 | 10:36:00 | 10.0 | 5.6 |
| 2-Feb-01 | 10:37:00 | 11.0 | 5.2 |
| 2-Feb-01 | 10:38:50 | 9.142 | 8.334 |
| 2-Feb-01 | 10:39:50 | 10.356 | 7.383 |
| 2-Feb-01 | 10:40:50 | 11.154 | 6.732 |
| 2-Feb-01 | 10:41:50 | 11.859 | 6.201 |
| 2-Feb-01 | 10:42:50 | 12.379 | 5.83 |
| 2-Feb-01 | 10:43:50 | 12.548 | 5.689 |
| 2-Feb-01 | 10:44:50 | 12.721 | 5.542 |
| 2-Feb-01 | 10:45:50 | 12.999 | 5.308 |
| 2-Feb-01 | 10:46:50 | 13.341 | 5.033 |
| 2-Feb-01 | 10:47:50 | 13.797 | 4.686 |
| 2-Feb-01 | 10:48:50 | 13.441 | 5.162 |
| 2-Feb-01 | 10:49:50 | 9.002 | 8.805 |
| 2-Feb-01 | 10:50:50 | 7.876 | 9.207 |
| Averge | | 11.43 | 6.59 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M29-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2-Feb-01 | 9:45:00 | 13.314 | 5.328 |
| 2-Feb-01 | 9:46:00 | 10.023 | 7.636 |
| 2-Feb-01 | 9:47:00 | 9.985 | 7.295 |
| 2-Feb-01 | 9:48:00 | 7.953 | 9.017 |
| 2-Feb-01 | 9:49:00 | 11.025 | 6.729 |
| 2-Feb-01 | 9:50:00 | 12.542 | 5.567 |
| 2-Feb-01 | 9:51:00 | 13.149 | 5.055 |
| 2-Feb-01 | 9:52:00 | 13.659 | 4.666 |
| 2-Feb-01 | 9:53:00 | 13.887 | 4.462 |
| 2-Feb-01 | 9:54:00 | 14.0 | 4.8 |
| 2-Feb-01 | 9:55:00 | 14.3 | 4.8 |
| 2-Feb-01 | 9:56:00 | 14.4 | 4.4 |
| 2-Feb-01 | 9:57:00 | 13.8 | 7.6 |
| 2-Feb-01 | 9:58:00 | 13.8 | 9.6 |
| 2-Feb-01 | 9:59:00 | 10.0 | 8.0 |
| 2-Feb-01 | 10:00:00 | 10.0 | 6.4 |
| 2-Feb-01 | 10:01:00 | 10.3 | 5.2 |
| 2-Feb-01 | 10:02:00 | 10.5 | 4.8 |
| 2-Feb-01 | 10:03:00 | 12.0 | 4.4 |
| 2-Feb-01 | 10:04:00 | 12.8 | 6.0 |
| 2-Feb-01 | 10:05:00 | 13.5 | 10.4 |
| 2-Feb-01 | 10:06:00 | 14.0 | 8.4 |
| 2-Feb-01 | 10:07:00 | 13.8 | 6.4 |
| 2-Feb-01 | 10:08:00 | 6.5 | 6.4 |
| 2-Feb-01 | 10:09:00 | 10.8 | 6.0 |
| 2-Feb-01 | 10:10:00 | 11.8 | 5.6 |
| 2-Feb-01 | 10:11:00 | 12.0 | 5.2 |
| 2-Feb-01 | 10:12:00 | 12.0 | 8.0 |
| 2-Feb-01 | 10:13:00 | 12.3 | 8.0 |
| 2-Feb-01 | 10:14:00 | 13.0 | 7.6 |
| 2-Feb-01 | 10:15:00 | 13.5 | 8.4 |
| 2-Feb-01 | 10:16:00 | 13.3 | 6.8 |
| 2-Feb-01 | 10:17:00 | 10.0 | 6.8 |
| 2-Feb-01 | 10:18:00 | 10.3 | 6.4 |
| 2-Feb-01 | 10:19:00 | 8.3 | 6.4 |
| 2-Feb-01 | 10:20:00 | 10.8 | 6.0 |
| 2-Feb-01 | 10:21:00 | 11.0 | 6.0 |
| 2-Feb-01 | 10:22:00 | 11.5 | 5.6 |
| 2-Feb-01 | 10:23:00 | 11.5 | 4.8 |
| 2-Feb-01 | 10:24:00 | 12.0 | 9.2 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M29-1**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2-Feb-01 | 10:25:00 | 12.3 | 7.2 |
| 2-Feb-01 | 10:26:00 | 12.5 | 8.0 |
| 2-Feb-01 | 10:27:00 | 8.3 | 7.2 |
| 2-Feb-01 | 10:28:00 | 9.8 | 5.2 |
| 2-Feb-01 | 10:29:00 | 9.5 | 4.8 |
| 2-Feb-01 | 10:30:00 | 10.3 | 8.8 |
| 2-Feb-01 | 10:31:00 | 11.0 | 9.6 |
| 2-Feb-01 | 10:32:00 | 12.5 | 8.8 |
| 2-Feb-01 | 10:33:00 | 8.5 | 8.0 |
| 2-Feb-01 | 10:34:00 | 6.8 | 6.8 |
| 2-Feb-01 | 10:35:00 | 9.0 | 6.0 |
| 2-Feb-01 | 10:36:00 | 10.0 | 5.6 |
| 2-Feb-01 | 10:37:00 | 11.0 | 5.2 |
| 2-Feb-01 | 10:38:50 | 9.142 | 8.334 |
| 2-Feb-01 | 10:39:50 | 10.356 | 7.383 |
| 2-Feb-01 | 10:40:50 | 11.154 | 6.732 |
| 2-Feb-01 | 10:41:50 | 11.859 | 6.201 |
| 2-Feb-01 | 10:42:50 | 12.379 | 5.83 |
| 2-Feb-01 | 10:43:50 | 12.548 | 5.689 |
| 2-Feb-01 | 10:44:50 | 12.721 | 5.542 |
| 2-Feb-01 | 10:45:50 | 12.999 | 5.308 |
| 2-Feb-01 | 10:46:50 | 13.341 | 5.033 |
| 2-Feb-01 | 10:47:50 | 13.797 | 4.686 |
| 2-Feb-01 | 10:48:50 | 13.441 | 5.162 |
| 2-Feb-01 | 10:49:50 | 9.002 | 8.805 |
| 2-Feb-01 | 10:50:50 | 7.876 | 9.207 |
| Average | | 11.4 | 6.6 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**M29-2**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 2/101 | 13:10:40 | 12.234 | 10.311 |
| 2/ 2/101 | 13:11:40 | 12.206 | 10.314 |
| 2/ 2/101 | 13:12:40 | 12.756 | 10.317 |
| 2/ 2/101 | 13:13:40 | 14.074 | 10.309 |
| 2/ 2/101 | 13:14:40 | 13.328 | 9.972 |
| 2/ 2/101 | 13:15:40 | 10.234 | 7.67 |
| 2/ 2/101 | 13:16:40 | 11.05 | 7.004 |
| 2/ 2/101 | 13:17:40 | 11.536 | 6.625 |
| 2/ 2/101 | 13:18:40 | 11.618 | 6.53 |
| 2/ 2/101 | 13:19:40 | 11.92 | 6.294 |
| 2/ 2/101 | 13:20:40 | 12.272 | 5.982 |
| 2/ 2/101 | 13:21:40 | 12.518 | 5.758 |
| 2/ 2/101 | 13:22:40 | 12.732 | 5.584 |
| 2/ 2/101 | 13:23:40 | 13.156 | 5.244 |
| 2/ 2/101 | 13:24:40 | 13.666 | 4.887 |
| 2/ 2/101 | 13:25:40 | 9.666 | 8.662 |
| 2/ 2/101 | 13:26:40 | 9.954 | 7.847 |
| 2/ 2/101 | 13:27:40 | 10.525 | 7.298 |
| 2/ 2/101 | 13:28:40 | 10.578 | 7.215 |
| 2/ 2/101 | 13:29:40 | 10.941 | 6.885 |
| 2/ 2/101 | 13:30:40 | 11.39 | 6.555 |
| 2/ 2/101 | 13:31:40 | 11.845 | 6.212 |
| 2/ 2/101 | 13:32:40 | 12.062 | 6.027 |
| 2/ 2/101 | 13:33:40 | 12.517 | 5.692 |
| 2/ 2/101 | 13:34:40 | 12.331 | 5.808 |
| 2/ 2/101 | 13:35:40 | 12.425 | 5.735 |
| Average | | 11.9 | 7.2 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M29-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 2/101 | 14:05:40 | 11.067 | 6.854 |
| 2/ 2/101 | 14:06:40 | 12.001 | 6.139 |
| 2/ 2/101 | 14:07:40 | 12.618 | 5.666 |
| 2/ 2/101 | 14:08:40 | 12.799 | 5.49 |
| 2/ 2/101 | 14:09:40 | 12.477 | 5.712 |
| 2/ 2/101 | 14:10:40 | 13.105 | 5.259 |
| 2/ 2/101 | 14:11:40 | 13.592 | 4.935 |
| 2/ 2/101 | 14:12:40 | 9.819 | 8.358 |
| 2/ 2/101 | 14:13:40 | 8.463 | 9.02 |
| 2/ 2/101 | 14:14:40 | 9.677 | 8.046 |
| 2/ 2/101 | 14:15:40 | 10.817 | 7.177 |
| 2/ 2/101 | 14:16:40 | 12.037 | 6.247 |
| 2/ 2/101 | 14:17:40 | 12.796 | 5.649 |
| 2/ 2/101 | 14:18:40 | 13.024 | 5.44 |
| 2/ 2/101 | 14:19:40 | 13.155 | 5.3 |
| 2/ 2/101 | 14:20:40 | 13.629 | 4.916 |
| 2/ 2/101 | 14:21:40 | 14.112 | 4.56 |
| 2/ 2/101 | 14:22:40 | 14.351 | 4.379 |
| 2/ 2/101 | 14:23:40 | 14.475 | 4.27 |
| 2/ 2/101 | 14:24:40 | 14.376 | 4.313 |
| 2/ 2/101 | 14:25:40 | 14.53 | 4.196 |
| 2/ 2/101 | 14:26:40 | 14.627 | 4.109 |
| 2/ 2/101 | 14:27:40 | 14.71 | 4.045 |
| 2/ 2/101 | 14:28:40 | 14.759 | 4.007 |
| 2/ 2/101 | 14:29:40 | 14.893 | 3.932 |
| 2/ 2/101 | 14:30:40 | 10.106 | 8.306 |
| 2/ 2/101 | 14:31:40 | 8.54 | 9.271 |
| 2/ 2/101 | 14:32:40 | 11.493 | 6.733 |
| 2/ 2/101 | 14:33:40 | 12.352 | 5.993 |
| 2/ 2/101 | 14:34:40 | 12.726 | 5.615 |
| 2/ 2/101 | 14:35:40 | 13.453 | 5.064 |
| 2/ 2/101 | 14:36:40 | 13.989 | 4.628 |
| 2/ 2/101 | 14:37:40 | 14.408 | 4.314 |
| 2/ 2/101 | 14:38:40 | 14.506 | 4.2 |
| 2/ 2/101 | 14:39:40 | 14.414 | 4.437 |
| 2/ 2/101 | 14:40:40 | 9.517 | 8.583 |
| 2/ 2/101 | 14:41:40 | 9.219 | 8.215 |
| 2/ 2/101 | 14:42:40 | 9.438 | 7.957 |
| 2/ 2/101 | 14:43:40 | 11.199 | 6.607 |
| 2/ 2/101 | 14:44:40 | 12.119 | 5.929 |

**Malcolm Grow Medical Center - Andrews AFB, MD**
Medical Waste Incinerator
CEM Responses

**M29-3**

| Date | Time | O2 | CO2 |
|---|---|---|---|
| 2/ 2/101 | 14:45:40 | 12.499 | 5.637 |
| 2/ 2/101 | 14:46:40 | 12.631 | 5.51 |
| 2/ 2/101 | 14:47:40 | 13.095 | 5.183 |
| 2/ 2/101 | 14:48:40 | 13.289 | 5.01 |
| 2/ 2/101 | 14:49:40 | 13.679 | 4.731 |
| 2/ 2/101 | 14:50:40 | 14.163 | 4.4 |
| 2/ 2/101 | 14:51:40 | 13.954 | 4.725 |
| 2/ 2/101 | 14:52:40 | 7.934 | 9.962 |
| 2/ 2/101 | 14:53:40 | 8.355 | 8.839 |
| 2/ 2/101 | 14:54:40 | 8.583 | 8.571 |
| 2/ 2/101 | 14:55:40 | 10.17 | 7.502 |
| 2/ 2/101 | 14:56:40 | 11.624 | 6.438 |
| 2/ 2/101 | 14:57:40 | 12.475 | 5.779 |
| Average | | 12.3 | 6.0 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**Run 1**

| Date | Time | O2 | CO2 | NOx | CO | SO2 |
|---|---|---|---|---|---|---|
| 1-Feb-01 | 9:11:00 | 13.4 | 4.9 | 42.0 | 1.4 | 1.8 |
| 1-Feb-01 | 9:12:00 | 14.0 | 4.4 | 42.3 | 1.4 | 1.4 |
| 1-Feb-01 | 9:13:00 | 14.3 | 4.2 | 41.7 | 1.3 | 1.1 |
| 1-Feb-01 | 9:14:00 | 14.5 | 4.0 | 39.9 | 1.3 | 0.8 |
| 1-Feb-01 | 9:15:00 | 13.4 | 4.6 | 39.3 | 1.4 | 0.7 |
| 1-Feb-01 | 9:16:00 | 13.5 | 4.6 | 41.1 | 1.3 | 0.6 |
| 1-Feb-01 | 9:17:00 | 10.7 | 7.6 | 46.2 | 1.3 | 0.4 |
| 1-Feb-01 | 9:18:00 | 9.9 | 7.8 | 65.4 | 1.3 | 0.8 |
| 1-Feb-01 | 9:19:00 | 9.8 | 7.6 | 49.5 | 1.6 | 3.4 |
| 1-Feb-01 | 9:20:00 | 10.2 | 7.4 | 43.6 | 1.8 | 3.4 |
| 1-Feb-01 | 9:21:00 | 12.3 | 5.7 | 30.5 | 1.7 | 3.1 |
| 1-Feb-01 | 9:22:00 | 13.0 | 5.2 | 30.6 | 1.6 | 2.5 |
| 1-Feb-01 | 9:23:00 | 13.6 | 4.7 | 33.4 | 1.2 | 1.8 |
| 1-Feb-01 | 9:24:00 | 13.9 | 4.4 | 34.3 | 0.9 | 1.3 |
| 1-Feb-01 | 9:25:00 | 14.0 | 4.3 | 35.3 | 0.6 | 1.0 |
| 1-Feb-01 | 9:26:00 | 14.2 | 4.1 | 35.2 | 0.4 | 0.7 |
| 1-Feb-01 | 9:27:00 | 14.5 | 3.9 | 34.2 | 0.3 | 0.6 |
| 1-Feb-01 | 9:28:00 | 13.9 | 4.2 | 34.1 | 0.1 | 0.4 |
| 1-Feb-01 | 9:29:00 | 13.8 | 4.3 | 36.0 | 0.2 | 0.3 |
| 1-Feb-01 | 9:30:00 | 14.5 | 3.9 | 34.4 | 0.3 | 0.5 |
| 1-Feb-01 | 9:31:00 | 10.3 | 7.9 | 143.0 | 0.3 | 0.5 |
| 1-Feb-01 | 9:32:00 | 9.1 | 8.0 | 203.9 | 0.3 | 0.5 |
| 1-Feb-01 | 9:33:00 | 8.6 | 8.3 | 162.6 | 0.4 | 0.4 |
| 1-Feb-01 | 9:34:00 | 10.3 | 7.2 | 117.7 | 0.4 | 0.9 |
| 1-Feb-01 | 9:35:00 | 12.2 | 5.9 | 51.4 | 0.4 | 2.1 |
| 1-Feb-01 | 9:36:00 | 12.8 | 5.3 | 40.8 | 0.6 | 2.6 |
| 1-Feb-01 | 9:37:00 | 13.4 | 4.9 | 42.3 | 0.7 | 2.2 |
| 1-Feb-01 | 9:38:00 | 14.0 | 4.4 | 43.6 | 0.6 | 1.8 |
| 1-Feb-01 | 9:39:00 | 14.4 | 4.0 | 40.9 | 0.5 | 1.4 |
| 1-Feb-01 | 9:40:00 | 14.2 | 4.4 | 34.8 | 0.6 | 1.1 |
| 1-Feb-01 | 9:41:00 | 10.2 | 7.9 | 66.6 | 0.6 | 1.1 |
| 1-Feb-01 | 9:42:00 | 11.0 | 6.8 | 78.1 | 0.6 | 0.7 |
| 1-Feb-01 | 9:43:00 | 9.5 | 8.0 | 67.4 | 0.5 | 1.1 |
| 1-Feb-01 | 9:44:00 | 10.4 | 7.3 | 43.6 | 0.6 | 1.6 |
| 1-Feb-01 | 9:45:00 | 11.5 | 6.4 | 36.9 | 0.3 | 2.3 |
| 1-Feb-01 | 9:46:00 | 12.4 | 5.7 | 37.5 | 0.3 | 2.2 |
| 1-Feb-01 | 9:47:00 | 13.2 | 5.1 | 37.4 | 0.2 | 1.7 |
| 1-Feb-01 | 9:48:00 | 13.6 | 4.7 | 36.9 | 0.1 | 1.3 |
| 1-Feb-01 | 9:49:00 | 14.3 | 4.2 | 34.8 | -0.1 | 1.1 |
| 1-Feb-01 | 9:50:00 | 10.6 | 7.8 | 54.2 | -0.2 | 0.9 |
| 1-Feb-01 | 9:51:00 | 10.5 | 7.3 | 109.1 | -0.3 | 0.8 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**Run 1**

| Date | Time | O2 | CO2 | NOx | CO | SO2 |
|---|---|---|---|---|---|---|
| 1-Feb-01 | 9:52:00 | 8.9 | 8.5 | 137.7 | -0.2 | 1.1 |
| 1-Feb-01 | 9:53:00 | 8.7 | 8.7 | 136.1 | -0.1 | 1.8 |
| 1-Feb-01 | 9:54:00 | 10.0 | 7.6 | 106.0 | -0.3 | 2.5 |
| 1-Feb-01 | 9:55:00 | 10.6 | 7.2 | 88.8 | -0.3 | 2.9 |
| 1-Feb-01 | 9:56:00 | 11.0 | 6.9 | 76.1 | -0.3 | 2.8 |
| 1-Feb-01 | 9:57:00 | 11.4 | 6.5 | 62.4 | -0.1 | 2.4 |
| 1-Feb-01 | 9:58:00 | 11.6 | 6.3 | 52.1 | 0.1 | 2.2 |
| 1-Feb-01 | 9:59:00 | 12.2 | 5.9 | 42.1 | 0.2 | 1.9 |
| 1-Feb-01 | 10:00:00 | 12.6 | 5.6 | 39.8 | 0.4 | 1.6 |
| 1-Feb-01 | 10:01:00 | 10.9 | 7.4 | 55.9 | 0.3 | 1.4 |
| 1-Feb-01 | 10:02:00 | 9.0 | 8.7 | 106.2 | 0.0 | 1.4 |
| 1-Feb-01 | 10:03:00 | 9.6 | 8.1 | 116.8 | -0.5 | 2.1 |
| 1-Feb-01 | 10:04:00 | 9.7 | 7.9 | 129.5 | -0.8 | 3.7 |
| 1-Feb-01 | 10:05:00 | 10.5 | 7.1 | 103.4 | -1.0 | 3.8 |
| 1-Feb-01 | 10:06:00 | 11.2 | 6.6 | 84.3 | -0.9 | 3.3 |
| 1-Feb-01 | 10:07:00 | 11.9 | 6.0 | 57.1 | -1.0 | 2.6 |
| 1-Feb-01 | 10:08:00 | 12.3 | 5.8 | 38.5 | -0.8 | 2.2 |
| 1-Feb-01 | 10:09:00 | 12.5 | 5.6 | 43.0 | -0.5 | 1.8 |
| 1-Feb-01 | 10:10:00 | 12.9 | 5.3 | 49.7 | -0.5 | 1.6 |
| Average | | 11.9 | 6.1 | 63.3 | 0.4 | 1.6 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**Run 2**

| Date | Time | O2 | CO2 | NOx | CO | SO2 |
|---|---|---|---|---|---|---|
| 1-Feb-01 | 10:42:00 | 12.6 | 5.6 | 49.3 | 0.7 | 2.8 |
| 1-Feb-01 | 10:43:00 | 13.3 | 5.1 | 50.1 | 0.0 | 2.6 |
| 1-Feb-01 | 10:44:00 | 10.3 | 8.0 | 67.3 | -0.3 | 2.5 |
| 1-Feb-01 | 10:45:00 | 8.9 | 8.7 | 112.5 | -0.2 | 2.7 |
| 1-Feb-01 | 10:46:00 | 9.7 | 7.9 | 98.7 | -0.2 | 4.7 |
| 1-Feb-01 | 10:47:00 | 10.6 | 7.2 | 90.2 | -0.4 | 4.6 |
| 1-Feb-01 | 10:48:00 | 11.6 | 6.4 | 68.9 | -0.6 | 3.7 |
| 1-Feb-01 | 10:49:00 | 12.2 | 5.9 | 50.4 | -0.6 | 3.2 |
| 1-Feb-01 | 10:50:00 | 12.6 | 5.6 | 36.3 | -0.4 | 2.7 |
| 1-Feb-01 | 10:51:00 | 12.7 | 5.6 | 40.9 | -0.4 | 2.4 |
| 1-Feb-01 | 10:52:00 | 12.9 | 5.4 | 44.4 | -0.5 | 2.1 |
| 1-Feb-01 | 10:53:00 | 13.5 | 5.0 | 48.6 | -0.6 | 2.0 |
| 1-Feb-01 | 10:54:00 | 10.0 | 8.3 | 75.4 | -0.8 | 1.9 |
| 1-Feb-01 | 10:55:00 | 9.1 | 8.7 | 100.2 | -0.9 | 2.0 |
| 1-Feb-01 | 10:56:00 | 10.5 | 7.5 | 89.2 | -1.0 | 5.1 |
| 1-Feb-01 | 10:57:00 | 11.3 | 6.8 | 70.2 | -0.9 | 5.5 |
| 1-Feb-01 | 10:58:00 | 12.2 | 6.1 | 48.1 | -0.9 | 4.6 |
| 1-Feb-01 | 10:59:00 | 12.5 | 5.8 | 38.2 | -0.7 | 3.8 |
| 1-Feb-01 | 11:00:00 | 12.9 | 5.4 | 43.1 | -0.6 | 3.1 |
| 1-Feb-01 | 11:01:00 | 13.5 | 4.9 | 50.8 | -0.7 | 2.7 |
| 1-Feb-01 | 11:02:00 | 13.8 | 4.7 | 50.8 | -0.8 | 2.2 |
| 1-Feb-01 | 11:03:00 | 13.8 | 4.6 | 48.4 | -1.0 | 2.0 |
| 1-Feb-01 | 11:04:00 | 10.6 | 7.7 | 66.6 | -1.0 | 1.7 |
| 1-Feb-01 | 11:05:00 | 6.2 | 10.7 | 126.9 | -0.9 | 2.6 |
| 1-Feb-01 | 11:06:00 | 10.0 | 7.7 | 102.4 | -0.8 | 17.0 |
| 1-Feb-01 | 11:07:00 | 11.5 | 6.5 | 80.2 | -0.8 | 15.1 |
| 1-Feb-01 | 11:08:00 | 12.3 | 5.9 | 51.6 | -0.6 | 12.1 |
| 1-Feb-01 | 11:09:00 | 12.5 | 5.7 | 36.9 | -0.2 | 10.0 |
| 1-Feb-01 | 11:10:00 | 12.9 | 5.4 | 36.1 | 0.2 | 8.3 |
| 1-Feb-01 | 11:11:00 | 13.2 | 5.1 | 39.9 | 0.2 | 6.7 |
| 1-Feb-01 | 11:12:00 | 13.5 | 4.9 | 44.9 | -0.3 | 6.0 |
| 1-Feb-01 | 11:13:00 | 13.8 | 4.7 | 44.3 | -0.8 | 5.1 |
| 1-Feb-01 | 11:14:00 | 14.1 | 4.5 | 43.8 | -1.1 | 4.1 |
| 1-Feb-01 | 11:15:00 | 13.2 | 5.4 | 39.2 | -1.2 | 3.2 |
| 1-Feb-01 | 11:16:00 | 9.2 | 8.9 | 180.0 | -1.1 | 2.7 |
| 1-Feb-01 | 11:17:00 | 11.3 | 6.8 | 96.5 | -1.0 | 2.8 |
| 1-Feb-01 | 11:18:00 | 11.6 | 6.4 | 57.3 | -0.7 | 3.9 |
| 1-Feb-01 | 11:19:00 | 12.5 | 5.7 | 36.6 | -0.4 | 3.9 |
| 1-Feb-01 | 11:20:00 | 12.9 | 5.4 | 38.0 | -0.5 | 3.5 |
| 1-Feb-01 | 11:21:00 | 13.3 | 5.1 | 43.9 | -0.6 | 3.2 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**Run 2**

| Date | Time | O2 | CO2 | NOx | CO | SO2 |
|---|---|---|---|---|---|---|
| 1-Feb-01 | 11:22:00 | 13.7 | 4.8 | 42.8 | -1.0 | 2.8 |
| 1-Feb-01 | 11:23:00 | 13.9 | 4.6 | 40.6 | -1.0 | 2.4 |
| 1-Feb-01 | 11:24:00 | 14.1 | 4.5 | 40.9 | -1.0 | 2.2 |
| 1-Feb-01 | 11:25:00 | 14.2 | 4.3 | 40.2 | -1.0 | 2.0 |
| 1-Feb-01 | 11:26:00 | 14.6 | 4.2 | 38.7 | -1.0 | 1.8 |
| 1-Feb-01 | 11:27:00 | 9.7 | 8.5 | 59.1 | -1.0 | 1.6 |
| 1-Feb-01 | 11:28:00 | 8.1 | 9.2 | 113.0 | -0.8 | 1.7 |
| 1-Feb-01 | 11:29:00 | 9.5 | 8.1 | 120.7 | -0.9 | 5.6 |
| 1-Feb-01 | 11:30:00 | 10.2 | 7.6 | 114.8 | -1.0 | 7.5 |
| 1-Feb-01 | 11:31:00 | 11.1 | 6.9 | 95.5 | -1.0 | 7.1 |
| 1-Feb-01 | 11:32:00 | 11.5 | 6.6 | 79.9 | -0.7 | 6.0 |
| 1-Feb-01 | 11:33:00 | 11.6 | 6.5 | 69.1 | -0.3 | 4.7 |
| 1-Feb-01 | 11:34:00 | 11.6 | 6.5 | 60.2 | 0.2 | 3.9 |
| 1-Feb-01 | 11:35:00 | 12.0 | 6.2 | 49.3 | 0.8 | 3.6 |
| 1-Feb-01 | 11:36:00 | 12.0 | 6.2 | 41.3 | 1.2 | 3.4 |
| 1-Feb-01 | 11:37:00 | 12.4 | 5.9 | 39.3 | 1.1 | 3.2 |
| 1-Feb-01 | 11:38:00 | 12.3 | 5.9 | 43.5 | 0.6 | 2.9 |
| 1-Feb-01 | 11:39:00 | 12.5 | 5.8 | 45.4 | 0.0 | 2.6 |
| 1-Feb-01 | 11:40:00 | 12.9 | 5.4 | 45.1 | -0.5 | 2.3 |
| 1-Feb-01 | 11:41:00 | 13.3 | 5.1 | 46.6 | -0.8 | 2.0 |
| Average | | 11.9 | 6.2 | 62.7 | -0.5 | 4.2 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**Run 3**

| Date | Time | O2 | CO2 | NOx | CO | SO2 |
|---|---|---|---|---|---|---|
| 2-Feb-01 | 9:48:00 | 8.0 | 9.0 | 90.0 | -0.4 | 1.1 |
| 2-Feb-01 | 9:49:00 | 11.0 | 6.7 | 45.5 | -0.4 | 1.6 |
| 2-Feb-01 | 9:50:00 | 12.5 | 5.6 | 39.6 | -0.5 | 1.6 |
| 2-Feb-01 | 9:51:00 | 13.1 | 5.1 | 38.3 | -0.6 | 1.4 |
| 2-Feb-01 | 9:52:00 | 13.7 | 4.7 | 36.8 | -0.5 | 1.2 |
| 2-Feb-01 | 9:53:00 | 13.9 | 4.5 | 36.2 | -0.5 | 1.0 |
| 2-Feb-01 | 9:54:00 | 14.0 | 4.8 | 40.0 | 0.0 | 1.0 |
| 2-Feb-01 | 9:55:00 | 14.3 | 4.8 | 40.0 | 0.0 | 1.0 |
| 2-Feb-01 | 9:56:00 | 14.4 | 4.4 | 35.0 | 0.0 | 1.0 |
| 2-Feb-01 | 9:57:00 | 13.8 | 7.6 | 55.0 | 0.0 | 2.0 |
| 2-Feb-01 | 9:58:00 | 13.8 | 9.6 | 75.0 | 0.0 | 2.0 |
| 2-Feb-01 | 9:59:00 | 10.0 | 8.0 | 90.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:00:00 | 10.0 | 6.4 | 70.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:01:00 | 10.3 | 5.2 | 50.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:02:00 | 10.5 | 4.8 | 35.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:03:00 | 12.0 | 4.4 | 40.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:04:00 | 12.8 | 6.0 | 45.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:05:00 | 13.5 | 10.4 | 40.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:06:00 | 14.0 | 8.4 | 35.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:07:00 | 13.8 | 6.4 | 105.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:08:00 | 6.5 | 6.4 | 110.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:09:00 | 10.8 | 6.0 | 100.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:10:00 | 11.8 | 5.6 | 60.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:11:00 | 12.0 | 5.2 | 55.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:12:00 | 12.0 | 8.0 | 45.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:13:00 | 12.3 | 8.0 | 40.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:14:00 | 13.0 | 7.6 | 40.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:15:00 | 13.5 | 8.4 | 40.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:16:00 | 13.3 | 6.8 | 35.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:17:00 | 10.0 | 6.8 | 100.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:18:00 | 10.3 | 6.4 | 100.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:19:00 | 8.3 | 6.4 | 95.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:20:00 | 10.8 | 6.0 | 95.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:21:00 | 11.0 | 6.0 | 80.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:22:00 | 11.5 | 5.6 | 45.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:23:00 | 11.5 | 4.8 | 40.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:24:00 | 12.0 | 9.2 | 45.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:25:00 | 12.3 | 7.2 | 50.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:26:00 | 12.5 | 8.0 | 50.0 | 0.0 | 1.5 |
| 2-Feb-01 | 10:27:00 | 8.3 | 7.2 | 150.0 | 0.0 | 1.0 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

CEM Responses

**Run 3**

| Date | Time | O2 | CO2 | NOx | CO | SO2 |
|---|---|---|---|---|---|---|
| 2-Feb-01 | 10:28:00 | 9.8 | 5.2 | 200.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:29:00 | 9.5 | 4.8 | 135.0 | 0.0 | 3.0 |
| 2-Feb-01 | 10:30:00 | 10.3 | 8.8 | 125.0 | 0.0 | 3.0 |
| 2-Feb-01 | 10:31:00 | 11.0 | 9.6 | 85.0 | 0.0 | 2.5 |
| 2-Feb-01 | 10:32:00 | 12.5 | 8.8 | 65.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:33:00 | 8.5 | 8.0 | 50.0 | 0.5 | 1.5 |
| 2-Feb-01 | 10:34:00 | 6.8 | 6.8 | 35.0 | 1.0 | 1.5 |
| 2-Feb-01 | 10:35:00 | 9.0 | 6.0 | 40.0 | 0.5 | 1.0 |
| 2-Feb-01 | 10:36:00 | 10.0 | 5.6 | 40.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:37:00 | 11.0 | 5.2 | 145.0 | 0.0 | 2.0 |
| 2-Feb-01 | 10:38:50 | 9.1 | 8.3 | 120.4 | -0.1 | 2.1 |
| 2-Feb-01 | 10:39:50 | 10.4 | 7.4 | 107.6 | 0.0 | 2.2 |
| 2-Feb-01 | 10:40:50 | 11.2 | 6.7 | 84.6 | -0.2 | 2.1 |
| 2-Feb-01 | 10:41:50 | 11.9 | 6.2 | 63.3 | -0.2 | 2.0 |
| 2-Feb-01 | 10:42:50 | 12.4 | 5.8 | 38.9 | 0.0 | 1.8 |
| 2-Feb-01 | 10:43:50 | 12.5 | 5.7 | 32.3 | 0.2 | 1.6 |
| 2-Feb-01 | 10:44:50 | 12.7 | 5.5 | 40.8 | 0.2 | 1.5 |
| 2-Feb-01 | 10:45:50 | 13.0 | 5.3 | 45.7 | 0.1 | 1.3 |
| 2-Feb-01 | 10:46:50 | 13.3 | 5.0 | 48.6 | 0.0 | 1.4 |
| 2-Feb-01 | 10:47:50 | 13.8 | 4.7 | 46.0 | -0.2 | 1.3 |
| Average | | 11.5 | 6.5 | 66.1 | 0.0 | 1.7 |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

Oxygen Analyzer Drift Calculations and Gas Corrections

1-Feb-01

| Calibration Gases | System Calibration | Direct Calibration |
|---|---|---|
| 0.0 % | 0.1 | 0.0 |
| 12.53 % | 12.4 | 12.5 |
| 22.4 % | | 22.5 |

| System Calibration | | Direct Calibration | |
|---|---|---|---|
| Correlation | 1.000000 | Correlation | 0.99999 |
| Slope | 0.981644 | Slope | 1.004162 |
| Intercept | 0.100000 | Intercept | -0.025126 |
| Sampling System Bias | | Calibration Error | |
| 0.40% | | 0.00% | |
| 0.40% | | 0.12% | |
| | | 0.40% | |

| | | | |
|---|---|---|---|
| Pre Cal | 0.1 | | |
| | 12.4 | | |
| Run 1 | 11.9 | Corrected | 12.0 % $O_2$ |
| Post Cal | 0.1 | Drift | 0.00% |
| | 12.5 | | 0.40% |
| Run 2 | 11.9 | Corrected | 12.2 % $O_2$ |
| Post Cal | 0.10 | Drift | 0.00% |
| | 12.10 | | 1.60% |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

Oxygen Analyzer Drift Calculations and Gas Corrections

2-Feb-01

| Calibration Gases | System Calibration |
|---|---|
| 0.0 % | 0.0 |
| 12.53 % | 12.1 |
| 22.4 % | |

| Direct Calibration |
|---|
| 0.0 |
| 12.5 |
| 22.4 |

| | |
|---|---|
| Correlation | 1.000000 |
| Slope | 0.965682 |
| Intercept | 0.000000 |

Sampling System Bias
0.00%
1.60%

| | |
|---|---|
| Correlation | 0.999999 |
| Slope | 0.999894 |
| Intercept | -0.008771 |

Calibration Error
0.00%
0.12%
0.00%

| | | | |
|---|---|---|---|
| Pre Cal | 0.0 | | |
| | 12.1 | | |
| Run 3 | 11.5 | Corrected | 11.8 % $O_2$ |
| Post Cal | 0.1 | Drift | 0.40% |
| | 12.3 | | 0.80% |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

Carbon Dioxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

| Calibration Gases | System Calibration | Direct Calibration |
|---|---|---|
| 0.0 % | 1.0 | 0.0 |
| 10.04 % | 10.1 | 10.1 |
| 22.4 % | | 22.4 |

| | System | | Direct |
|---|---|---|---|
| Correlation | 1.000000 | Correlation | 0.999995 |
| Slope | 0.906375 | Slope | 0.999816 |
| Intercept | 1.000000 | Intercept | 0.021993 |

| Sampling System Bias | Calibration Error |
|---|---|
| 4.00% | 0.00% |
| 0.00% | 0.24% |
| | 0.00% |

| | | | |
|---|---|---|---|
| Pre Cal | 0.0 | | |
| | 10.1 | | |
| Run 1 | 6.1 | Corrected | 6.0 % $CO_2$ |
| Post Cal | 0.1 | Drift | 0.40% |
| | 10.2 | | 0.40% |
| Run 2 | 6.2 | Corrected | 6.1 % $CO_2$ |
| Post Cal | 0.20 | Drift | 0.40% |
| | 10.00 | | 0.80% |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

Carbon Dioxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

| Calibration Gases | System Calibration | Direct Calibration |
|---|---|---|
| 0.0 % | 0.1 | 0.0 |
| 10.04 % | 9.9 | 10.1 |
| 22.4 % | | 22.3 |

| System Calibration | | Direct Calibration | |
|---|---|---|---|
| Correlation | 1.000000 | Correlation | 0.999985 |
| Slope | 0.976096 | Slope | 0.995214 |
| Intercept | 0.100000 | Intercept | 0.038422 |

| Sampling System Bias | Calibration Error |
|---|---|
| 0.40% | 0.00% |
| 0.80% | 0.24% |
| | 0.40% |

| | | | |
|---|---|---|---|
| Pre Cal | 0.1 | | |
| | 9.9 | | |
| Run 3 | 6.5 | Corrected | 6.5 % $CO_2$ |
| Post Cal | 0.3 | Drift | 0.80% |
| | 10.0 | | 0.40% |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

Nitrogen Oxides Analyzer Drift Calculations and Gas Corrections

1-Feb-01

| Calibration Gases | System Calibration | Direct Calibration |
|---|---|---|
| 0.0 ppm | -0.5 | 0.2 |
| 254.1 ppm | 248.2 | 252.7 |
| 472.4 ppm | | 472.9 |

| | System | Direct |
|---|---|---|
| Correlation | 1.000000 | 0.999991 |
| Slope | 0.978749 | 1.000447 |
| Intercept | -0.500000 | -0.341592 |

| Sampling System Bias | Calibration Error |
|---|---|
| 0.14% | 0.04% |
| 0.90% | 0.28% |
| | 0.10% |

| | | | |
|---|---|---|---|
| Pre Cal | -0.5 | | |
| | 248.2 | | |
| Run 1 | 63.3 | Corrected | 65.3 ppm $NO_X$ |
| Post Cal | -0.4 | Drift | 0.02% |
| | 247.4 | | 0.16% |
| Run 2 | 62.7 | Corrected | 62.4 ppm $NO_X$ |
| Post Cal | 4.90 | Drift | 1.06% |
| | 249.30 | | 0.38% |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

Nitrogen Oxides Analyzer Drift Calculations and Gas Corrections

2-Feb-01

| Calibration Gases | System Calibration |
|---|---|
| 0.0 ppm | -0.1 |
| 254.1 ppm | 249.9 |
| 472.4 ppm | |

| Direct Calibration |
|---|
| -0.4 |
| 472.3 |
| 253.5 |

| | |
|---|---|
| Correlation | 1.000000 |
| Slope | 0.983865 |
| Intercept | -0.100000 |
| Sampling System Bias | |
| 0.06% | |
| 44.48% | |

| | |
|---|---|
| Correlation | 0.573006 |
| Slope | 0.573348 |
| Intercept | 102.9543 |
| Calibration Error | |
| 0.08% | |
| 43.64% | |
| 43.78% | |

| | | | |
|---|---|---|---|
| Pre Cal | -0.1<br>249.9 | | |
| Run 3 | 66.1 | Corrected | 67.6 ppm $NO_x$ |
| Post Cal | -0.4<br>248.5 | Drift | 0.06%<br>0.28% |

## Malcolm Grow Medical Center - Andrews AFB, MD

### Medical Waste Incinerator

Carbon Monoxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

| Calibration Gases | System Calibration | Direct Calibration |
|---|---|---|
| 0.0 ppm | 2.1 | -0.4 |
| 30.2 ppm | 29.1 | 30.0 |
| 59.5 ppm | | 60.0 |
| 89.7 ppm | | 90.7 |

| System Calibration | | Direct Calibration | |
|---|---|---|---|
| Correlation | 1.000000 | Correlation | 0.999995 |
| Slope | 0.894040 | Slope | 1.016406 |
| Intercept | 2.100000 | Intercept | -0.510816 |
| Sampling System Bias | | Calibration Error | |
| 2.50% | | 0.40% | |
| 0.90% | | 0.20% | |
| | | 0.50% | |
| | | 1.00% | |

| | | | |
|---|---|---|---|
| Pre Cal | 2.1 | | |
| | 29.1 | | |
| Run 1 | 0.4 | Corrected | -0.8 ppm CO |
| Post Cal | 0.1 | Drift | 2.00% |
| | 26.5 | | 2.60% |
| Run 2 | -0.5 | Corrected | -0.7 ppm CO |
| Post Cal | 0.10 | Drift | 0.00% |
| | 26.50 | | 0.00% |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

Carbon Monoxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

| Calibration Gases | System Calibration | Direct Calibration |
|---|---|---|
| 0.0 ppm | -0.5 | 0.8 |
| 30.2 ppm | 29.7 | 30.7 |
| 59.5 ppm | | 60.9 |
| 89.7 ppm | | 90.9 |

| System | | Direct | |
|---|---|---|---|
| Correlation | 1.000000 | Correlation | 0.99997 |
| Slope | 1.000000 | Slope | 1.006991 |
| Intercept | -0.500000 | Intercept | 0.661463 |

| Sampling System Bias | Calibration Error |
|---|---|
| 1.30% | 0.80% |
| 1.00% | 0.50% |
| | 1.40% |
| | 1.20% |

| | | | |
|---|---|---|---|
| Pre Cal | -0.5 | | |
| | 29.7 | | |
| Run 3 | 0.0 | Corrected | 0.0 ppm CO |
| Post Cal | 0.4 | Drift | 0.90% |
| | 30.4 | | 0.70% |

**Malcolm Grow Medical Center - Andrews AFB, MD**

Medical Waste Incinerator

Sulfur Dioxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

| Calibration Gases | System Calibration | Direct Calibration |
|---|---|---|
| 0.0 ppm | 2.1 | -0.2 |
| 45.1 ppm | 41.2 | 44.9 |
| 91.7 ppm | | 92.1 |

| | System | Direct |
|---|---|---|
| Correlation | 1.000000 | 0.999993 |
| Slope | 0.866962 | 1.006578 |
| Intercept | 2.100000 | -0.299964 |

| Sampling System Bias | Calibration Error |
|---|---|
| 2.30% | 0.20% |
| 3.70% | 0.20% |
| | 0.40% |

| | | | |
|---|---|---|---|
| Pre Cal | 2.1 | | |
| | 41.2 | | |
| Run 1 | 1.6 | Corrected | -0.6 ppm $SO_2$ |
| Post Cal | 2.2 | Drift | 0.10% |
| | 41.0 | | 0.20% |
| Run 2 | 4.2 | Corrected | 2.1 ppm $SO_2$ |
| Post Cal | 2.60 | Drift | 0.40% |
| | 41.20 | | 0.20% |

## Malcolm Grow Medical Center - Andrews AFB, MD

### Medical Waste Incinerator

Sulfur Dioxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

| Calibration Gases | System Calibration | Direct Calibration |
|---|---|---|
| 0.0 ppm | 3.0 | 0.1 |
| 45.1 ppm | 41.3 | 45.1 |
| 91.7 ppm | | 91.5 |

| | System | Direct |
|---|---|---|
| Correlation | 1.000000 | 1 |
| Slope | 0.849224 | 0.996723 |
| Intercept | 3.000000 | 0.116107 |

| Sampling System Bias | Calibration Error |
|---|---|
| 2.90% | 0.10% |
| 3.80% | 0.00% |
| | 0.20% |

| | | | |
|---|---|---|---|
| Pre Cal | 3.0 | | |
| | 41.3 | | |
| Run 3 | 1.7 | Corrected | -2.0 ppm $SO_2$ |
| Post Cal | 3.7 | Drift | 0.70% |
| | 41.0 | | 0.30% |

**Appendix B.5**

**Raw Field Data**

**Visible Emissions (M9)**

# VISIBLE EMISSIONS EVALUATOR

This is to certify that

*Bill Dunstan, Jr.*

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

| 281351 | Springfield, Virginia | October 18, 2000 |
|---|---|---|
| Certificate Number | Location | Date of Issue |

Thomas Hose
President

Michael W. Lunsford
Director of Training

# 6-MINUTE AVERAGES
# ANDREWS AFB, MD
# HOSPITAL INCINERATOR, BUILDING 1055

| 2/1/01, 1440-1510 | |
|---|---|
| six-minute interval | six-minute average |
| 0-6 | 0 |
| 6-12 | 0 |
| 12-18 | 0 |
| 18-24 | 0 |
| 24-30 | 0 |
| Total Avg. | 0 |

| 2/1/01, 1510-1540 | |
|---|---|
| six-minute interval | six-minute average |
| 30-36 | 0 |
| 36-42 | 0 |
| 42-48 | 0 |
| 48-54 | 0 |
| 54-60 | 0 |
| Total Avg. | 0 |

| 2/1/01, 1540-1610 | |
|---|---|
| six-minute interval | six-minute average |
| 60-66 | 0 |
| 66-72 | 0 |
| 72-78 | 0 |
| 78-84 | 0 |
| 84-90 | 0 |
| Total Avg. | 0 |

| 2/1/01, 1610-1640 | |
|---|---|
| six-minute interval | six-minute average |
| 90-96 | 0 |
| 96-102 | 0 |
| 102-108 | 0 |
| 108-114 | 0 |
| 114-120 | 0 |
| Total Avg. | 0 |

| 2/2/01, 945-1015 | |
|---|---|
| six-minute interval | six-minute average |
| 0-6 | 0 |
| 6-12 | 0 |
| 12-18 | 0 |
| 18-24 | 0 |
| 24-30 | 0 |
| Total Avg. | 0 |

| 2/2/01, 1015-1045 | |
|---|---|
| six-minute interval | six-minute average |
| 30-36 | 0 |
| 36-42 | 0 |
| 42-48 | 0 |
| 48-54 | 0 |
| 54-60 | 0 |
| Total Avg. | 0 |

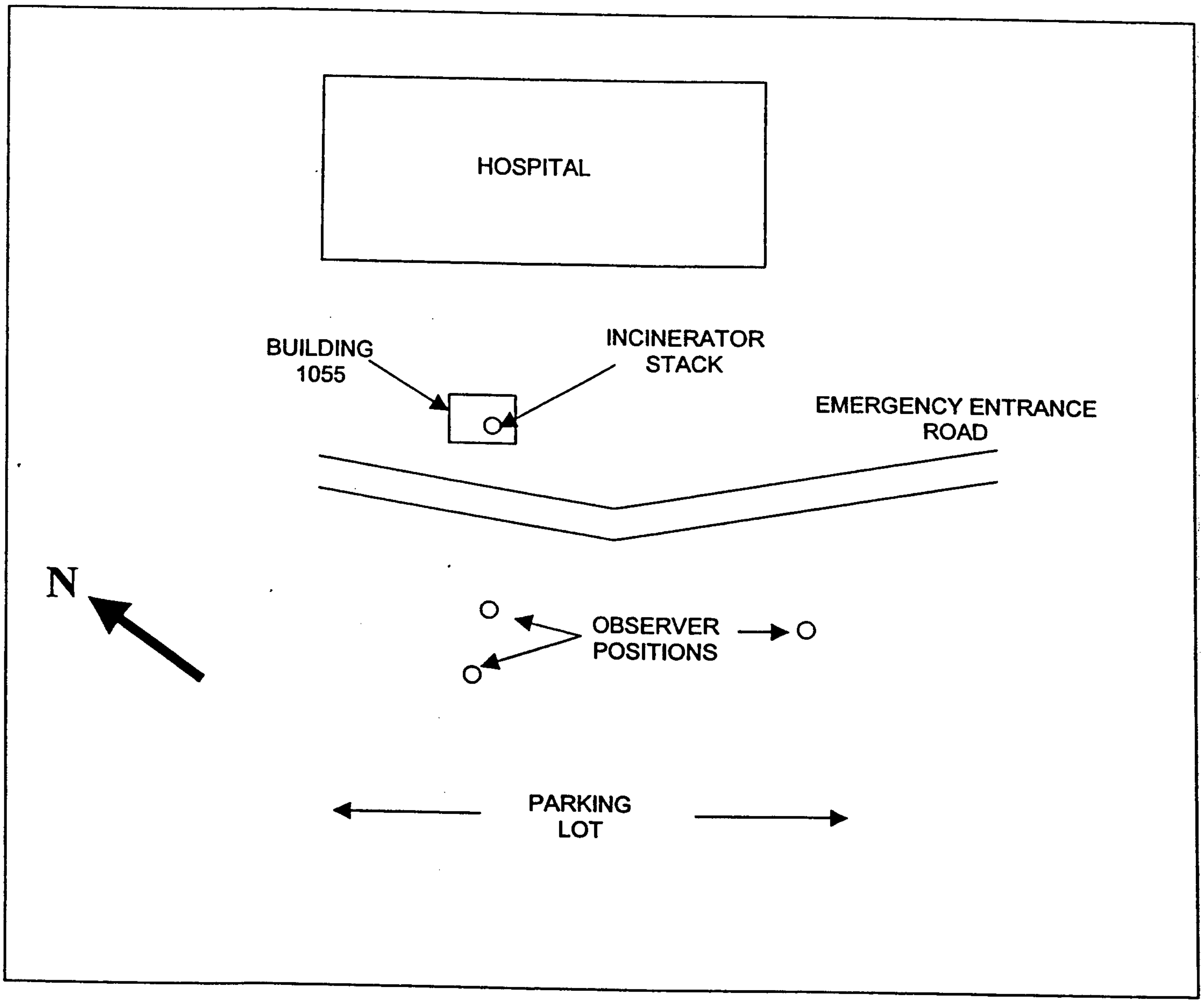
| 2/2/01, 1225-1255 | |
|---|---|
| six-minute interval | six-minute average |
| 60-66 | 0 |
| 66-72 | 0 |
| 72-78 | 0 |
| 78-84 | 0 |
| 84-90 | 0 |
| Total Avg. | 0 |

| 2/2/01, 1255-1325 | |
|---|---|
| six-minute interval | six-minute average |
| 90-96 | 0 |
| 96-102 | 0 |
| 102-108 | 0 |
| 108-114 | 0 |
| 114-120 | 0 |
| Total Avg. | 0 |

| 2/2/01, 1405-1435 | |
|---|---|
| six-minute interval | six-minute average |
| 120-126 | 0 |
| 126-132 | 0 |
| 132-138 | 0 |
| 138-144 | 0 |
| 144-150 | 0 |
| Total Avg. | 0 |

| 2/2/01, 1435-1505 | |
|---|---|
| six-minute interval | six-minute average |
| 150-156 | 0 |
| 156-162 | 0 |
| 162-168 | 0 |
| 168-174 | 0 |
| 174-180 | 0 |
| Total Avg. | 0 |

ANDREWS AFB, MD
HOSPITAL WASTE INCINERATOR – BUILDING 1055



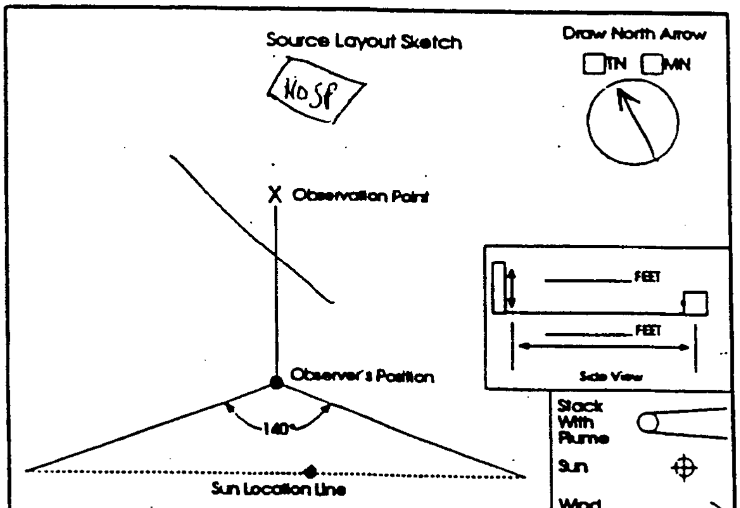
EPA

# VISIBLE EMISSION OBSERVATION FORM 1

| | |
|---|---|
| Form Number | Page ___ Of ___ |
| Continued on VEO Form Number | |

Method Used (Circle One): Method 9 (circled) 203A 203B Other: ____

| | | | |
|---|---|---|---|
| Company Name: Andrews AFB | | | |
| Facility Name: Hospital Incinerator – Bldg. 1055 | | | |
| Street Address: | | | |
| City: Andrews AFB | State: MD | Zip: | |
| Process: waste incineration | Unit #: | Operating Mode: | |
| Control Equipment: Scrubber | | Operating Mode: | |
| Describe Emission Point: southernmost stack | | | |
| Height of Emiss. Pt. Start: 30' End: same | | Height of Emiss. Pt. Rel. to Observer Start: 25' End: same | |
| Distance to Emiss. Pt. Start: 60' End: same | | Direction to Emiss. Pt. (Degrees) Start: 35°NE End: same | |
| Vertical Angle to Obs. Pt. Start: 20° End: same | | Direction to Obs. Pt. (Degrees) Start: 35°NE End: same | |
| Distance and Direction to Observation Point from Emission Point Start: 15' above | | End: same | |
| Describe Emissions Start: none (steam) | | End: same | |
| Emission Color Start: —— End: same | | Water Droplet Plume: Attached ☒ Detached ☐ None ☐ | |
| Describe Plume Background Start: sky | | End: same | |
| Background Color Start: bluegrey End: same | | Sky Conditions Start: Pt. cloudy End: same | |
| Wind Speed Start: 1-3 End: same | | Wind Direction Start: NE End: same | |
| Ambient Temp. Start: End: same | | Wet Bulb Temp.: | RH Percent: |




| Longitude | Latitude | Declination |
|---|---|---|
| | | |

Additional Information:

VEOF1.1

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/1/01 | EST | 1440 | 1510 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

| | |
|---|---|
| Observer's Name (Print): Bill Dunstan Jr. | |
| Observer's Signature: William Dunstan Jr. | Date: 2/1/01 |
| Organization: Pacific Environmental Services | |
| Certified By: Eastern Technical Associates | Date: 10/18/00 |

# EPA

# VISIBLE EMISSION OBSERVATION FORM 1

| | | | |
|---|---|---|---|
| Form Number | | Page | Of |
| Continued on VEO Form Number | | | |

Method Used (Circle One): Method 9 (circled) 203A 203B Other: ____

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City: Andrews AFB | State: MD | Zip:

Process: waste incineration | Unit #: | Operating Mode:

Control Equipment: Scrubber | Operating Mode:

Describe Emission Point: Southernmost stack

| | |
|---|---|
| Height of Emiss. Pt. Start 30' End same | Height of Emiss. Pt. Rel. to Observer Start 25' End same |
| Distance to Emiss. Pt. Start 60' End same | Direction to Emiss. Pt. (Degrees) Start 35°NE End same |
| Vertical Angle to Obs. Pt. Start 20° End same | Direction to Obs. Pt. (Degrees) Start 35°NE End same |

Distance and Direction to Observation Point from Emission Point: Start 15' above End same

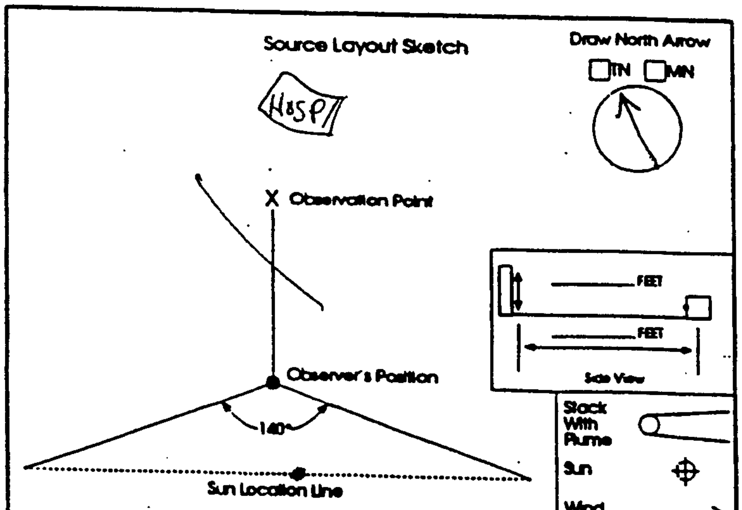
Describe Emissions: Start none (steam) End same

| | |
|---|---|
| Emission Color Start —— End same | Water Droplet Plume: Attached ☒ Detached ☐ None ☐ |

Describe Plume Background: Start sky End same

| | |
|---|---|
| Background Color Start blue gray End same | Sky Conditions Start Pt cloudy End same |
| Wind Speed Start 1-3 End same | Wind Direction Start NE End same |
| Ambient Temp. Start End same | Wet Bulb Temp. / RH Percent |

Source Layout Sketch




| Longitude | Latitude | Declination |
|---|---|---|
| | | |

Additional Information:

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/1/01 | EST | 1510 | 1540 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. | Date: 2/1/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates | Date: 10/18/00

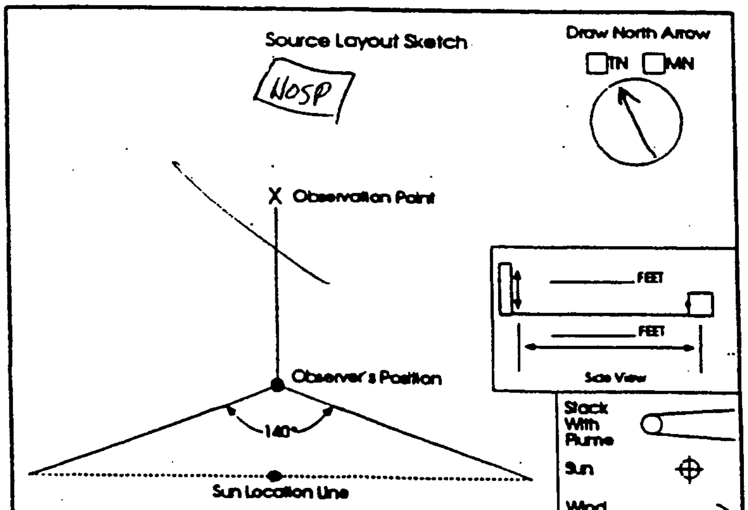
VEOF1.1

# EPA

# VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): Method 9 (circled) | 203A | 203B | Other: ______

| | |
|---|---|
| Company Name | Andrews AFB |
| Facility Name | Hospital Incinerator – Bldg. 1055 |
| Street Address | |
| City | Andrews AFB |
| State | MD |
| Zip | |
| Process | waste incineration |
| Unit # | |
| Operating Mode | |
| Control Equipment | Scrubber |
| Operating Mode | |
| Describe Emission Point | Southernmost stack |
| Height of Emiss. Pt. | Start 30′ End Same |
| Height of Emiss. Pt. Rel. to Observer | Start 25′ End Same |
| Distance to Emiss. Pt. | Start 80′ End Same |
| Direction to Emiss. Pt. (Degrees) | Start 30° NE End Same |
| Vertical Angle to Obs. Pt. | Start 20° End Same |
| Direction to Obs. Pt. (Degrees) | Start 30° NE End Same |
| Distance and Direction to Observation Point from Emission Point | Start 15′ above End Same |
| Describe Emissions | Start None (Steam) End Same |
| Emission Color | Start — End Same |
| Water Droplet Plume | Attached ☒ Detached ☐ None ☐ |
| Describe Plume Background | Start Sky End Same |
| Background Color | Start blue-gray End Same |
| Sky Conditions | Start P. cloudy End Same |
| Wind Speed | Start 1-3 End Same |
| Wind Direction | Start NE End Same |
| Ambient Temp. | Start End Same |
| Wet Bulb Temp. | |
| RH Percent | |




| Longitude | Latitude | Declination |
|---|---|---|
| | | |

Additional Information

| Form Number | Page | Of |
|---|---|---|
| | | |

Continued on VEO Form Number

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/1/01 | EST | 1540 | 1610 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

| | |
|---|---|
| Observer's Name (Print) | Bill Dunstan Jr. |
| Observer's Signature | William Dunstan Jr. |
| Date | 2/1/01 |
| Organization | Pacific Environmental Services |
| Certified By | Eastern Technical Associates |
| Date | 10/18/00 |

VEOF1.1

# EPA

# VISIBLE EMISSION OBSERVATION FORM 1

| | | | |
|---|---|---|---|
| Form Number | | Page | Of |
| Continued on VEO Form Number | | | |

**Method Used (Circle One):** Method 9 (circled) 203A 203B Other: ____

**Company Name:** Andrews AFB

**Facility Name:** Hospital Incinerator – Bldg. 1055

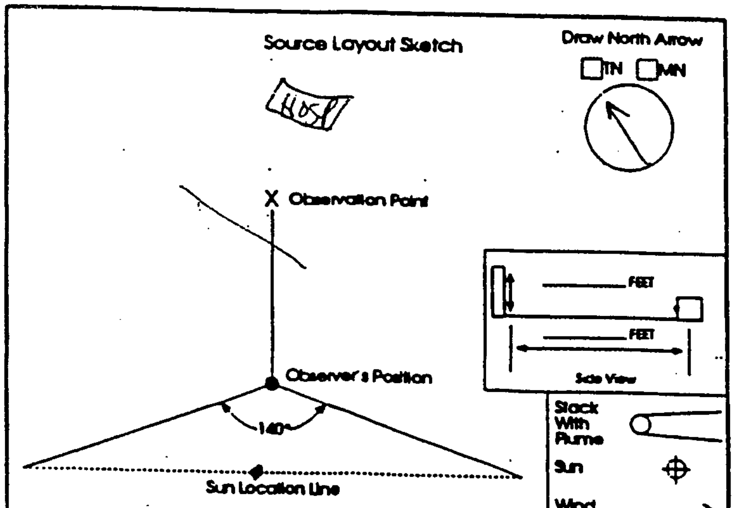
**Street Address:**

| City | State | Zip |
|---|---|---|
| Andrews AFB | MD | |

| Process | Unit # | Operating Mode |
|---|---|---|
| waste incineration | | |
| **Control Equipment** | | **Operating Mode** |
| Scrubber | | |

**Describe Emission Point:** Southernmost stack

| | | | |
|---|---|---|---|
| Height of Emiss. Pt. Start 30′ | End Same | Height of Emiss. Pt. Rel. to Observer Start 25′ | End Same |
| Distance to Emiss. Pt. Start 80′ | End Same | Direction to Emiss. Pt. (Degrees) Start 30° NE | End Same |
| Vertical Angle to Obs. Pt. Start 20° | End Same | Direction to Obs. Pt. (Degrees) Start 30° NE | End Same |
| Distance and Direction to Observation Point from Emission Point Start 15 above | | End Same | |
| Describe Emissions Start None (Steam) | | End Same | |
| Emission Color Start —— | End Same | Water Droplet Plume Attached ☒ Detached ☐ None ☐ | |
| Describe Plume Background Start Sky | | End Same | |
| Background Color Start blue gray | End Same | Sky Conditions Start p. cloudy | End Same |
| Wind Speed Start 1-3 | End Same | Wind Direction Start NE | End Same |
| Ambient Temp. Start | End Same | Wet Bulb Temp. | RH Percent |




| Longitude | Latitude | Declination |
|---|---|---|
| | | |

**Additional Information:**

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/1/01 | EST | 1610 | 1640 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

| | |
|---|---|
| Observer's Name (Print): Bill Dunstan Jr. | |
| Observer's Signature: William Dunstan Jr. | Date: 2/1/01 |
| Organization: Pacific Environmental Services | |
| Certified By: Eastern Technical Associates | Date: 10/18/00 |

VEOF1.1

# EPA

# VISIBLE EMISSION OBSERVATION FORM 1

| Form Number | Page | Of |
|---|---|---|
| Continued on VEO Form Number | | |

Method Used (Circle One): Method 9 | 203A | 203B | Other: ______

| | |
|---|---|
| Company Name | Andrews AFB |
| Facility Name | Hospital Incinerator – Bldg. 1055 |
| Street Address | |
| City | Andrews AFB |
| State | MD |
| Zip | |

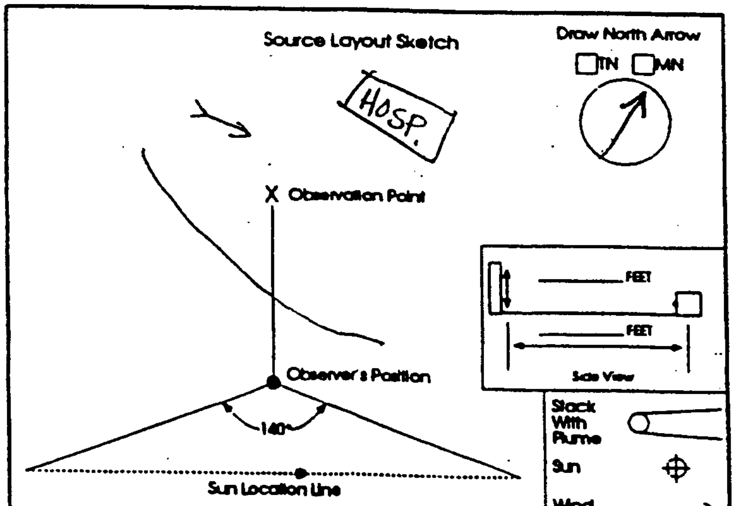
| Process | Unit # | Operating Mode |
|---|---|---|
| waste incineration | | |
| **Control Equipment** | | **Operating Mode** |
| Scrubber | | |

Describe Emission Point: southernmost stack

| | |
|---|---|
| Height of Emiss. Pt. | Start 30' End same |
| Height of Emiss. Pt. Rel. to Observer | Start 25' End same |
| Distance to Emiss. Pt. | Start 100' End same |
| Direction to Emiss. Pt. (Degrees) | Start 344° NW End same |
| Vertical Angle to Obs. Pt. | Start 20° End same |
| Direction to Obs. Pt. (Degrees) | Start 10NE End same |
| Distance and Direction to Observation Point from Emission Point | Start 20-30' E End same |
| Describe Emissions | Start None (steam) End same |
| Emission Color | Start — End same |
| Water Droplet Plume | Attached ☒ Detached ☐ None ☐ |
| Describe Plume Background | Start sky End same |
| Background Color | Start blue/white End same |
| Sky Conditions | Start p. cloudy End same |
| Wind Speed | Start 1-3 End same |
| Wind Direction | Start E End same |
| Ambient Temp. | Start 10°C End same |
| Wet Bulb Temp. | |
| RH Percent | |

Source Layout Sketch

Draw North Arrow ☐ TN ☐ MN




| Longitude | Latitude | Declination |
|---|---|---|
| | | |

Additional Information:

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/2/01 | EST | 945 | 1015 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

| | |
|---|---|
| Observer's Name (Print) | Bill Dunstan Jr. |
| Observer's Signature | William Dunstan Jr. |
| Date | 2/2/01 |
| Organization | Pacific Environmental Services |
| Certified By | Eastern Technical Associates |
| Date | 10/18/2000 |

VEOF1.1

# EPA

# VISIBLE EMISSION OBSERVATION FORM 1

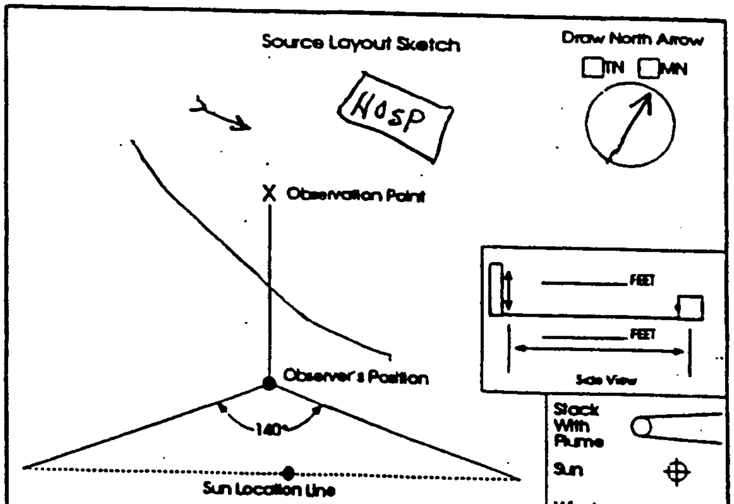
| Form Number | Page | Of |
|---|---|---|
| Continued on VEO Form Number | | |

Method Used (Circle One): Method 9 (circled) 203A 203B Other: ______

| | |
|---|---|
| Company Name | Andrews AFB |
| Facility Name | Hospital Incinerator – Bldg. 1055 |
| Street Address | |
| City | Andrews AFB |
| State | MD |
| Zip | |
| Process | waste incineration |
| Unit # | |
| Operating Mode | |
| Control Equipment | Scrubber |
| Operating Mode | |
| Describe Emission Point | southernmost stack |
| Height of Emiss. Pt. | Start 30' End same |
| Height of Emiss. Pt. Rel. to Observer | Start 25' End Same |
| Distance to Emiss. Pt. | Start 100' End Same |
| Direction to Emiss. Pt. (Degrees) | Start 344° NW End Same |
| Vertical Angle to Obs. Pt. | Start 20° End Same |
| Direction to Obs. Pt. (Degrees) | Start 10° NE End Same |
| Distance and Direction to Observation Point from Emission Point | Start 20-30' E End Same |
| Describe Emissions | Start none (steam) End Same |
| Emission Color | Start —— End Same |
| Water Droplet Plume | Attached [X] Detached [ ] None [ ] |
| Describe Plume Background | Start Sky End Same |
| Background Color | Start blue/white End Same |
| Sky Conditions | Start Pt. cloudy End Same |
| Wind Speed | Start 1-3 End Same |
| Wind Direction | Start E End Same |
| Ambient Temp. | Start 9°C End Same |
| Wet Bulb Temp. | |
| RH Percent | |

Source Layout Sketch

Draw North Arrow [ ] TN [ ] MN




| Longitude | Latitude | Declination |
|---|---|---|
| | | |

Additional Information

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/2/01 | EST | 1015 | 1045 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

| | |
|---|---|
| Observer's Name (Print) | Bill Dunstan Jr. |
| Observer's Signature | William Dunstan Jr. |
| Date | 2/2/01 |
| Organization | Pacific Environmental Services |
| Certified By | Eastern Technical Associates |
| Date | 10/18/00 |

VEOF1.1

# EPA

# VISIBLE EMISSION OBSERVATION FORM 1

| Form Number | Page | Of |
|---|---|---|
| | | |

Continued on VEO Form Number

Method Used (Circle One): (Method 9) 203A 203B Other:

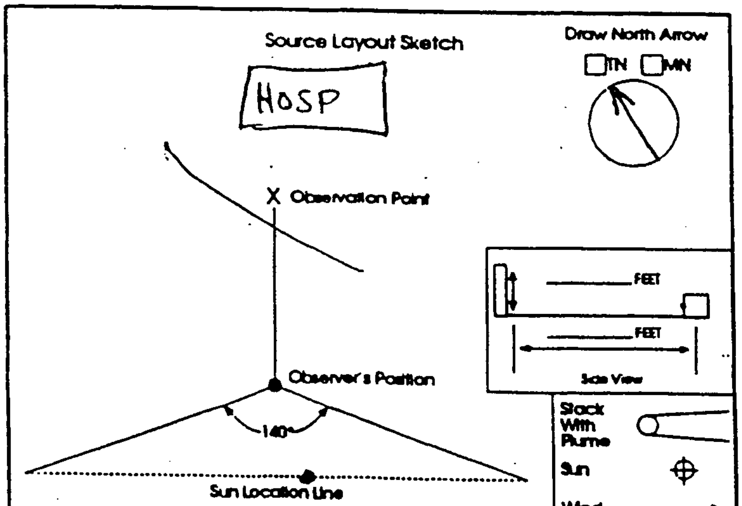
| | |
|---|---|
| Company Name | Andrews AFB |
| Facility Name | Hospital Incinerator – Bldg. 1055 |
| Street Address | |
| City | Andrews AFB |
| State | MD |
| Zip | |

| | | | |
|---|---|---|---|
| Process: waste incineration | Unit #: | Operating Mode: | |
| Control Equipment: Scrubber | | Operating Mode: | |

Describe Emission Point: Southernmost stack

| | | | |
|---|---|---|---|
| Height of Emiss. Pt. | Start 30' End Same | Height of Emiss. Pt. Rel. to Observer | Start 25' End Same |
| Distance to Emiss. Pt. | Start 80' End Same | Direction to Emiss. Pt. (Degrees) | Start 30°NE End Same |
| Vertical Angle to Obs. Pt. | Start 20° End Same | Direction to Obs. Pt. (Degrees) | Start 45°NE End Same |
| Distance and Direction to Observation Point from Emission Point | Start 15' E | | End Same |
| Describe Emissions | Start none (steam) | | End Same |
| Emission Color | Start — End Same | Water Droplet Plume | Attached ☒ Detached ☐ None ☐ |
| Describe Plume Background | Start sky | | End Same |
| Background Color | Start blue End Same | Sky Conditions | Start P. cloudy End Same |
| Wind Speed | Start 1-3 End Same | Wind Direction | Start E End Same |
| Ambient Temp. | Start 11°C End Same | Wet Bulb Temp. | RH Percent |

Source Layout Sketch




| Longitude | Latitude | Declination |
|---|---|---|
| | | |

Additional Information

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/2/01 | EST | 1225 | 1255 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

| | |
|---|---|
| Observer's Name (Print) | Bill Dunstan Jr. |
| Observer's Signature | William Dunstan Jr. |
| Date | 2/2/01 |
| Organization | Pacific Environmental Services |
| Certified By | Eastern Technical Associates |
| Date | 6/18/00 |

VEOF1.1

# EPA

# 'ISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): Method 9 (circled) | 203A | 203B | Other: ______

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City: Andrews AFB | State: MD | Zip:

Process: waste incineration | Unit #: | Operating Mode:

Control Equipment: Scrubber | Operating Mode:

Describe Emission Point: Southernmost stack

Height of Emiss. Pt.: Start 30' End same | Height of Emiss. Pt. Rel. to Observer: Start 25' End Same

Distance to Emiss. Pt.: Start 80' End Same | Direction to Emiss. Pt. (Degrees): Start 30°NE End Same

Vertical Angle to Obs. Pt.: Start 20° End Same | Direction to Obs. Pt. (Degrees): Start 45°NE End Same

Distance and Direction to Observation Point from Emission Point: Start 15' E End Same

Describe Emissions: Start none (steam) End Same

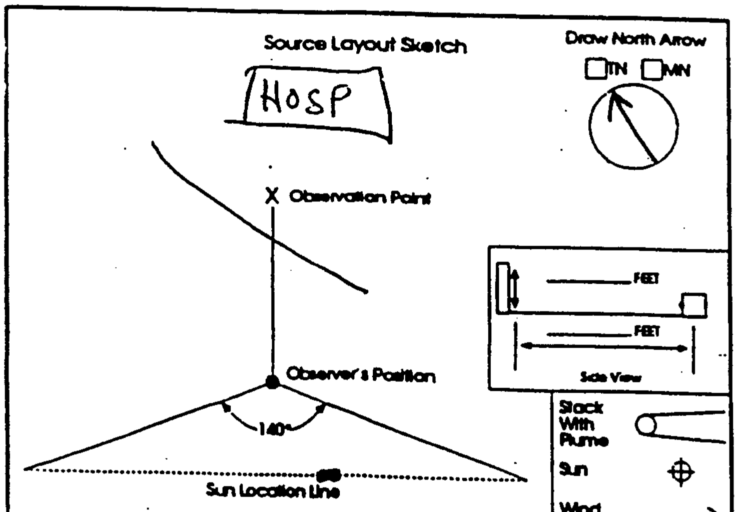
Emission Color: Start — End Same | Water Droplet Plume: Attached ☒ Detached ☐ None ☐

Describe Plume Background: Start sky End Same

Background Color: Start blue End Same | Sky Conditions: Start p. cloudy End Same

Wind Speed: Start 1-3 End Same | Wind Direction: Start E End Same

Ambient Temp.: Start 11°C End Same | Wet Bulb Temp.: | RH Percent:




Longitude: | Latitude: | Declination:

Additional Information:

VEOF1.1

Form Number: | Page: | Of:

Continued on VEO Form Number:

Observation Date: 2/2/01 | Time Zone: EST | Start Time: 1255 | End Time: 1325

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. | Date: 2/2/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates | Date: 10/18/00

EPA

# VISIBLE EMISSION OBSERVATION FORM 1

| Form Number | Page | Of |
|---|---|---|
| Continued on VEO Form Number | | |

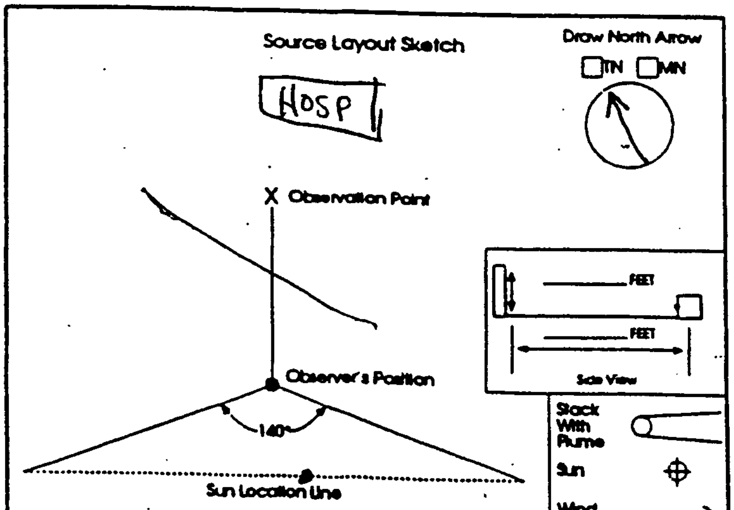
Method Used (Circle One): **Method 9** (circled) 203A 203B Other: ______

| | |
|---|---|
| Company Name | Andrews AFB |
| Facility Name | Hospital Incinerator – Bldg. 1055 |
| Street Address | |
| City | Andrews AFB |
| State | MD |
| Zip | |

| | | |
|---|---|---|
| Process: waste incineration | Unit # | Operating Mode |
| Control Equipment: Scrubber | | Operating Mode |

Describe Emission Point: southernmost stack

| | |
|---|---|
| Height of Emiss. Pt. Start 30' End same | Height of Emiss. Pt. Rel. to Observer Start 25' End same |
| Distance to Emiss. Pt. Start 80' End same | Direction to Emiss. Pt. (Degrees) Start 30° NE End same |
| Vertical Angle to Obs. Pt. Start 20° End same | Direction to Obs. Pt. (Degrees) Start 45° NE End same |
| Distance and Direction to Observation Point from Emission Point Start 15' E | End same |
| Describe Emissions Start none (steam) | End same |
| Emission Color Start — End same | Water Droplet Plume Attached ☒ Detached ☐ None ☐ |
| Describe Plume Background Start sky | End same |
| Background Color Start blue End same | Sky Conditions Start p. cloudy End same |
| Wind Speed Start 1-3 End same | Wind Direction Start E End same |
| Ambient Temp. Start 11°C End same | Wet Bulb Temp. / RH Percent |




| Longitude | Latitude | Declination |
|---|---|---|
| | | |

Additional Information

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/2/01 | EST | 1405 | 1435 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

| | |
|---|---|
| Observer's Name (Print) | Bill Dunstan Jr. |
| Observer's Signature | William Dunstan Jr. |
| Date | 2/2/01 |
| Organization | Pacific Environmental Services |
| Certified By | Eastern Technical Associates |
| Date | 10/18/00 |

VEOF1.1

EPA

# VISIBLE EMISSION OBSERVATION FORM 1

| Form Number | Page | Of |
|---|---|---|
| | | |

Continued on VEO Form Number:

Method Used (Circle One): **Method 9** (circled) 203A 203B Other: ______

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City: Andrews AFB | State: MD | Zip:

Process: waste incineration | Unit #: | Operating Mode:

Control Equipment: Scrubber | Operating Mode:

Describe Emission Point: Southernmost stack

Height of Emiss. Pt.: Start 30' End Same | Height of Emiss. Pt. Rel. to Observer: Start 25' End Same

Distance to Emiss. Pt.: Start 80' End Same | Direction to Emiss. Pt. (Degrees): Start 30°NE End Same

Vertical Angle to Obs. Pt.: Start 20° End Same | Direction to Obs. Pt. (Degrees): Start 45°NE End Same

Distance and Direction to Observation Point from Emission Point: Start 15' E End Same

Describe Emissions: Start none (steam) End Same

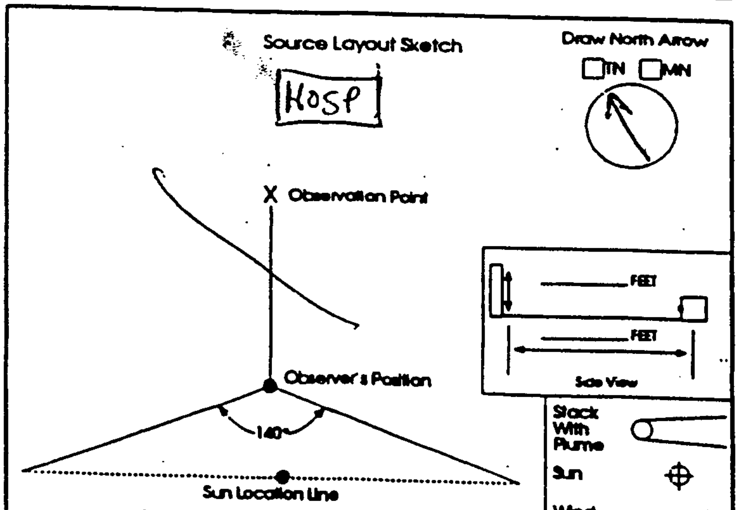
Emission Color: Start — End Same | Water Droplet Plume: Attached ☒ Detached ☐ None ☐

Describe Plume Background: Start Sky End Same

Background Color: Start blue End Same | Sky Conditions: Start p. cloudy End Same

Wind Speed: Start 1-3 End Same | Wind Direction: Start E End Same

Ambient Temp.: Start 11°C End Same | Wet Bulb Temp.: | RH Percent:




Longitude: | Latitude: | Declination:

Additional Information:

| Observation Date | Time Zone | Start Time | End Time |
|---|---|---|---|
| 2/2/01 | EST | 1435 | 1505 |

| Min \ Sec | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | |

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. | Date: 2/2/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates | Date: 10/18/00

# APPENDIX C

# ANALYTICAL DATA

**Appendix C.1**

**Analytical Data**

**Particulate Matter/Metals (M29)**

**Hydrogen Chloride (M26)**

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

# SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator Run ID: M29-1

Sample Location: Incinerator Outlet

Analytical Balance S/P 182 Lab Relative Humidity: 30% Amb. Temp. 75

| RINSE CONTAINER ID: M29-1-AR | | | | Rinse Beaker ID: | 1 | |
|---|---|---|---|---|---|---|
| Lab Added Vol., ml | 75 | | Density of Acetone ($\rho_a$) | 0.7848 | g/ml | |
| Container Final Wt | 234.3 | | Acetone Blank Concent ($C_a$) | 0.00000084 | g/g | ok |
| Container Initial Wt | 168.4 | | Acetone Rinse Volume ($V_{aw}$) | 159 | ml | |
| Net Volume Wt., g | 65.9 | | $W_a = C_a V_{aw} \rho_a =$ | 0.00011 | g | 0.0001% ok |
| Weighing Date | 2/8/01 | Time 1645 | Gross Wt | 108.8239 | g | |
| Last Weighing Date | 2/9/01 | Time 0910 | Gross Wt | 108.8237 | g | |
| | | | Average of 2 Consecutive Weighings Meeting Criteria | 108.8238 | g | |
| Blank Beaker ID | 4 | | - Rinse Beaker Tare Wt | 108.8209 | g | |
| Acetone Volume, ml | 150.99 | | - Acetone Blank (Wa) | 0.0001 | g | |
| Acetone Residue, g | 0.0001 | | Weight in Acetone Rinse (ma) | 0.0028 | g | |
| | | | = Weight in Acetone Rinse (ma) | 2.79 | mg | |

| FILTER SAMPLE ID: M29-1-F | | | Filter/Container ID: | 104-007 | |
|---|---|---|---|---|---|
| Weighing Date | 2/6/01 | Time 1700 | Gross Wt | 34.5242 | g |
| Last Weighing Date | 2/7/01 | Time 920 | Gross Wt | 34.5237 | g |
| | | | Average of 2 Consecutive Weighings Meeting Criteria | 34.52395 | g |
| | | | - Filter & Container Tare Wt | 34.5204 | g |
| | | | = Weight on Filter (mf) | 0.00355 | g |
| | | | = Weight on Filter (mf) | 3.55 | mg |

| SUMMARY | | |
|---|---|---|
| Weight on Filter ($m_f$) | 3.55 | mg |
| + Weight in Acetone Rinse (ma) | 2.79 | mg |
| = Total Particulate (mn) | 6.34 | mg |

v1.0 10/15/00

Signature of Analyst ______________ Signature of Reviewer ______________

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

# SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator    Run ID: M29-2

Sample Location: Incinerator Outlet

Analytical Balance S/P 182    Lab Relative Humidity: 30%    Amb. Temp. 75

| RINSE CONTAINER ID: M29-2-AR | | | | Rinse Beaker ID: | | | 2 |
|---|---|---|---|---|---|---|---|
| Lab Added Vol., ml | 75 | | | Density of Acetone ($\rho_a$) | 0.7848 | g/ml | |
| Container Final Wt | 252.4 | | | Acetone Blank Concent ($C_a$) | 0.00000084 | g/g | ok |
| Container Initial Wt | 167.9 | | | Acetone Rinse Volume ($V_{aw}$) | 182.7 | ml | |
| Net Volume Wt., g | 84.5 | | | $W_a = C_a V_{aw} \rho_a =$ | 0.00012 | g | 0.0001% ok |
| Weighing Date | 2/8/01 | Time | 1645 | Gross Wt | 101.4551 | g | |
| Last Weighing Date | 2/9/01 | Time | 0910 | Gross Wt | 101.4551 | g | |
| | | | | Average of 2 Consecutive Weighings Meeting Criteria | 101.4551 | g | |
| Blank Beaker ID | 4 | | | - Rinse Beaker Tare Wt | 101.4507 | g | |
| Acetone Volume, ml | 150.99 | | | - Acetone Blank (Wa) | 0.0001 | g | |
| Acetone Residue, g | 0.0001 | | | Weight in Acetone Rinse (ma) | 0.0043 | g | |
| | | | | = Weight in Acetone Rinse (ma) | 4.28 | mg | |

| FILTER SAMPLE ID: M29-2-F | | | | Filter/Container ID: | 104-003 | |
|---|---|---|---|---|---|---|
| Weighing Date | 2/6/01 | Time | 1700 | Gross Wt | 34.9589 | g |
| Last Weighing Date | 2/7/01 | Time | 920 | Gross Wt | 34.9585 | g |
| | | | | Average of 2 Consecutive Weighings Meeting Criteria | 34.9587 | g |
| | | | | - Filter & Container Tare Wt | 34.888 | g |
| | | | | = Weight on Filter (mf) | 0.0707 | g |
| | | | | = Weight on Filter (mf) | 70.7 | mg |

| SUMMARY | | |
|---|---|---|
| Weight on Filter ($m_f$) | 70.7 | mg |
| + Weight in Acetone Rinse (ma) | 4.28 | mg |
| = Total Particulate (mn) | 75.0 | mg |

v1.0 10/15/00

Signature of Analyst ____________    Signature of Reviewer ____________

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

# SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator — Run ID: M29-3

Sample Location: Incinerator Outlet

Analytical Balance S/P 182 Lab Relative Humidity: 30% Amb. Temp. 75

| RINSE CONTAINER ID: M29-3-AR | | | | Rinse Beaker ID: | 3 | | |
|---|---|---|---|---|---|---|---|
| Lab Added Vol., ml | 75 | | | Density of Acetone ($\rho_a$) | 0.7848 | g/ml | |
| Container Final Wt | 219.4 | | | Acetone Blank Concent ($C_a$) | 0.00000084 | g/g | ok |
| Container Initial Wt | 167.6 | | | Acetone Rinse Volume ($V_{aw}$) | 141 | ml | |
| Net Volume Wt., g | 51.8 | | | $W_a = C_a V_{aw} \rho_a =$ | 0.00009 | g | 0.0001% ok |
| Weighing Date | 2/8/01 | Time | 1645 | Gross Wt | 105.0907 | g | |
| Last Weighing Date | 2/9/01 | Time | 0910 | Gross Wt | 105.0907 | g | |
| | | | | Average of 2 Consecutive Weighings Meeting Criteria | 105.0907 | g | |
| Blank Beaker ID | 4 | | | - Rinse Beaker Tare Wt | 105.0856 | g | |
| Acetone Volume, ml | 150.99 | | | - Acetone Blank (Wa) | 0.00009 | g | |
| Acetone Residue, g | 0.0001 | | | Weight in Acetone Rinse (ma) | 0.00501 | g | |
| | | | | = Weight in Acetone Rinse (ma) | 5.01 | mg | |

| FILTER SAMPLE ID: M29-3-F | | | | Filter/Container ID: | 104-005 | |
|---|---|---|---|---|---|---|
| Weighing Date | 2/7/01 | Time | 0920 | Gross Wt | 35.1023 | g |
| Last Weighing Date | 2/7/01 | Time | 1705 | Gross Wt | 35.1024 | g |
| | | | | Average of 2 Consecutive Weighings Meeting Criteria | 35.10235 | g |
| | | | | - Filter & Container Tare Wt | 35.0363 | g |
| | | | | = Weight on Filter (mf) | 0.06605 | g |
| | | | | = Weight on Filter (mf) | 66.05 | mg |

| SUMMARY | | |
|---|---|---|
| Weight on Filter ($m_f$) | 66.05 | mg |
| + Weight in Acetone Rinse (ma) | 5.01 | mg |
| = Total Particulate (mn) | 71.06 | mg |

v1.0 10/15/00

Signature of Analyst ______________ Signature of Reviewer ______________

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

# FINAL WEIGHT DATA SHEET

Project Number: **F181.001**

Plant: Andrews AFB Medical Waste Ininerator

Item Weighed: Filters

| | | | | | | |
|---|---|---|---|---|---|---|
| Date | | 2/6/01 | 2/6/01 | 2/7/01 | 2/7/01 | |
| Time | | 1100 | 1700 | 0920 | 1705 | |
| Relative Humidity (%): | | 28% | 31% | 30 | 32.5 | |
| Temperature (°F) | | 78.5 | 74.5 | 77.4 | 75.7 | |
| Standard Weight (g): | 49.9998 | ~~100.0000~~ | 49.9998 | 49.9998 | 50.0000 | |
| Analyst: | | mdm | mdm | mdm | mdm | |

| ID Number | Field Sample ID | WEIGHINGS, g 1st | 2nd | 3rd | 4th | 5th | Average of Consecutive Constant Wts |
|---|---|---|---|---|---|---|---|
| 104-007 | M29-1 | 34.5258 | 34.5242 | 34.5237 | | | |
| 104-005 | M29-3 | 35.1053 | 35.1031 | 35.1023 | 35.1024 | | |
| 104-003 | M29-2 | 34.9605 | 34.9589 | 34.9585 | | | |

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

# Method 5 Tare Weights

Project Number: F181.001

Item Weighed: Beakers

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date: | [redacted] | 2/7/01 | 2/7/01 | | | | | | | |
| Time | | 0920 | 1705 | | | | | | | |
| R.H (%) | | 30 | 32.5 | | | | | | | |
| Temp (°F) | | 77.4 | 75.8 | | | | | | | |
| Std. Wt. (g) | | 100.0002 | 100.0004 | | | | | | | |
| Analyst | | MDM | MDM | | | | | | | |
| Lab Sample ID No. | Field Sample ID No. | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | Difference (mg) | Average Filter Tare Weight(s) (mg) |
| 1 | ~~M~~ M29-1 | 108.8207 | 108.8211 | | | | | | 0 | |
| 2 | M29-2 | 101.4505 | 101.4508 | | | | | | 0 | |
| 3 | M29-3 | 105.0854 | 105.0857 | | | | | | 0 | |
| 4 | B | 106.8072 | 106.8076 | | | | | | 0 | |
| 5 | | 106.7693 | 106.7096 | | | | | | 0 | |
| 6 | | 100.8258 | 100.8261 | | | | | | 0 | |
| 7 | | 106.0642 | 106.6646 | | | | | | 0 | |
| 8 | | 111.6062 | 111.6066 | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |
| | | | | | | | | | 0 | |

# METHOD 5
## TARE WEIGHT

Project Number: F181-001 Item Weighed: Filters

| Date | | 01/24/01 | 1/25/01 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| R.H. (%) | | 28 | 30 | | | | | | |
| Temp. (°F) | | 71.9 | 71.9 | | | | | | |
| Std. Wt. | | 10.0001 | 10.0001 | | | | | | |
| Analyst | | DDH | DDH | | | | | | |
| ID Number | Field Sample Number | 1st | 2nd | 3rd | 4th | 5th | Final Wt. (g) | Tare Wt. (g) | Difference (mg) |
| 104-001 | | 35.8571 | 35.8571 | | | | | | |
| 104-002 | | 35.0523 | 35.0523 | | | | | | |
| 104-003 | M29-2 | 34.8880 | 34.8880 | | | | | | |
| 104-004 | | 35.5645 | 35.5645 | | | | | | |
| 104-005 | M29-3 | 35.0363 | 35.0363 | | | | | | |
| 104-006 | | 36.0069 | 36.0069 | | | | | | |
| 104-007 | M29-1 | 34.5204 | 34.5204 | | | | | | |
| 104-008 | | 35.6565 | 35.6565 | | | | | | |

# First Analytical Laboratories

## ANALYSIS REPORT

**Method 29: Multi-Metals**
**Method 26A: HCl**

**Project # 104-01-0048**

Prepared for:

Pacific Environmental Services, Inc.
5001 South Miami Blvd.
Research Triangle Park, NC 27709

Reviewed and Approved by:

WHWadlin

William H. Wadlin, Ph. D.
Laboratory Manager

February 19, 2001

# First Analytical Laboratories

## CASE NARRATIVE

Project #: 10204 Report Date: 19-Feb-01
Client: Pacific Environmental Services
Client Project ID: 101-01-0048

Samples:

Four sets of Method 29 Multi-Metals Trains were submitted, one of which was the blank set. The elements of interest were cadmium, lead and mercury. In addition, four samples were submitted for determination of HCl by Method 26A. All of the samples were hand delivered in good condition, with no apparent leakage or damage.

Preparation:

The metals samples were all prepared and analyzed according to EPA Method 29, *Determination of Metals Emissions from Stationary Sources*. The Method 26A samples did not require any sample preparation.

Analysis:

Cadmium and lead were determined by Graphite Furnace Atomic Absorption Spectrophotometry (GFAA). Mercury was determined by Cold Vapor Atomic Absorption Spectrophotometry (CVAA). HCl was determined as chloride by Ion Chromatography with conductivity detection (IC).

Results:

The metals results are presented as total micrograms of element found in the whole analytical fraction listed, for each such fraction specified in the method. The HCl results are given as total milligrams present in the whole original sample. All of the target elements were measurable in all of the runs. The highest levels found were for lead, at about 500 $\mu$g per run. The mercury levels found decreased exponentially with run number from about 73 $\mu$g to 0.6 $\mu$g.

Quality Control:

None of the target elements were found in the blanks. All of the spike recoveries were within the normal range of 75% to 125%. All of the samples were analyzed in duplicate. Whenever the sample levels were at least five times the detection limit, the duplicates agreed within the normal range of 20%.

PACIFIC ENVIRONMENTAL SERVICES, INC.

C ...al P...
5001 South Miami Boulevard, P.O. Box 12
Research Triangle Park, North Carolina 27709-2
(919) 941-0333 FAX: (919) 941-0

# Chain of Custody Record

Project Num: F181.001
Project Name: Andrews AFB Medical Waste Incinerator
Samplers: DD Holzschuh, J Falank, MD Maret

| Date | Time | Field Sample ID | Sample Description | Cd | Pb | Hg | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/2/01 | 0945 | M29-1-1 | Filter, dry | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 0945 | M29-1-2 | Front Half Acetone Dry-down residue | ✓ | ✓ | ✓ | | | | | Beaker No. 1 |
| 2/2/01 | 0945 | M29-1-3 | 0.1 N $HNO_3$ Front Half rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 0945 | M29-1-4 | Contents of Imps. 1-3 and 0.1 N $HNO_3$ Rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 0945 | M29-1-5A | Contents of Imp 4 and 0.1 N $HNO_3$ Rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 0945 | M29-1-5B | Contents of Imps. 5-6, $KMnO_4$ and DI Rinses | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 0945 | M29-1-5C | Imps. 5-6 8N HCl Rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1230 | M29-2-1 | Filter, dry | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1230 | M29-2-2 | Front Half Acetone Dry-down residue | ✓ | ✓ | ✓ | | | | | Beaker No. 2 |
| 2/2/01 | 1230 | M29-2-3 | 0.1 N $HNO_3$ Front Half rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1230 | M29-2-4 | Contents of Imps. 1-3 and 0.1 N $HNO_3$ Rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1230 | M29-2-5A | Contents of Imp 4 and 0.1 N $HNO_3$ Rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1230 | M29-2-5B | Contents of Imps. 5-6, $KMnO_4$ and DI Rinses | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1230 | M29-2-5C | Imps. 5-6 8N HCl Rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1405 | M29-3-1 | Filter, dry | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1405 | M29-3-2 | Front Half Acetone Dry-down residue | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1405 | M29-3-3 | 0.1 N $HNO_3$ Front Half rinse | ✓ | ✓ | ✓ | | | | | Beaker No. 3 |
| 2/2/01 | 1405 | M29-3-4 | Contents of Imps. 1-3 and 0.1 N $HNO_3$ Rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1405 | M29-3-5A | Contents of Imp 4 and 0.1 N $HNO_3$ Rinse | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1405 | M29-3-5B | Contents of Imps. 5-6, $KMnO_4$ and DI Rinses | ✓ | ✓ | ✓ | | | | | |
| 2/2/01 | 1405 | M29-3-5C | Imps. 5-6 8N HCl Rinse | ✓ | ✓ | ✓ | | | | | |

Page 1/2

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park W
5001 South Miami Boulevard, P.O. Box 12(
Research Triangle Park, North Carolina 27709-2(
(919) 941-0333 FAX: (919) 941-0;

# Chain of Custody Record

Project Numb: F161.001

Project Name: Andrews AFB Medical Waste Incinerator

Samplers: DD Holzschuh, J Falank, MD Maret

| Date | Time | Field Sample ID | Sample Description | Analysis Requested: Cl | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/31/01 | 1045 | M26-1 | Acid Impinger Contents and Rinses | ✓ | | | | | | | Run 1 |
| 2/1/01 | 0910 | M26-2 | Acid Impinger Contents and Rinses | ✓ | | | | | | | Run 2 |
| 2/1/01 | 0945 | M26-3 | Acid Impinger Contents and Rinses | ✓ | | | | | | | Run 3 |

| Relinquished | Date/Time | Received by: (Signature) | |
|---|---|---|---|
| [signature] | 2/12/01 | | [redacted] |

[redacted]

| Relinquished by: (Signature) | Date/Time | Received for lab by: (Signature) | REMARKS |
|---|---|---|---|
| | 2/12/01 | WbWadlin FIRST ANALYTICAL LABS | |

Page 1 of 2

First Analytical Laboratories
1126 Burning Tree Dr. Chapel Hill, NC 27514
Tel. (919) 942-8607
FAX (919) 929-8688

# ANALYSIS REPORT

Project #: 10204
Client: Pacific Environmental Services
Client Project ID: 104-01-0048

Report Date: 19-Feb-01
Date Received: 12-Feb-01

## Total Micrograms in Analytical Fraction

| Sample | Cd<br>µg | Pb<br>µg |
|---|---|---|
| M29-1 Front | 1.86 | 427 |
| M29-1 Back | 1.69 | 7.1 |
| M29-2 Front | 6.22 | 550 |
| M29-2 Back | 0.44 | 4.4 |
| M29-3 Front | 6.09 | 480 |
| M29-3 Back | 0.24 | 1.2 |
| Blank Front | <0.02 | <0.5 |
| Blank Back | <0.03 | <0.6 |

## QC SUMMARY

| | | |
|---|---|---|
| Front Spike, %Recov. | 101% | 100% |
| Back Spike, %Recov. | 105% | 104% |

First Analytical Laboratories
1126 Burning Tree Dr. Chapel Hill, NC 27514
Tel. (919) 942-8607
FAX (919) 929-8688

# ANALYSIS REPORT

Project #: 10204
Client: Pacific Environmental Services
Client Project ID:

Report Date: 15-Feb-01
Date Received: 12-Feb-01

## Total Micrograms Mercury in Analytical Fraction

| Sample | Frac1 | Frac2B | Frac3A | Frac3B | Frac3C | Total |
|---|---|---|---|---|---|---|
| Blank | <0.40 | <0.95 | <0.10 | <0.12 | <0.58 | <2.15 |
| M29-1 | <0.40 | 58.8 | 1.09 | 3.98 | 9.17 | 73.0 |
| M29-2 | <0.40 | 3.85 | <0.12 | 0.56 | <1.12 | 4.41 |
| M29-3 | <0.40 | <2.28 | 0.10 | 0.45 | <1.12 | 0.55 |

## QC SUMMARY

Back Spike, %Recov. 106%

First Analytical Laboratories
1126 Burning Tree Dr. Chapel Hill, NC 27514
Tel. (919) 942-8607
FAX (919) 929-8688

# ANALYSIS REPORT

Project #: 10204
Client: Pacific Environmental Services
Client Project ID: 104-01-0048

Report Date: 19-Feb-01
Date Received: 12-Feb-01

## Total Milligrams in Sample

| | HCl mg |
|---|---|
| M26A-1 | 2.8 |
| M26A-~~3~~ 2 AW | 0.3 |
| M26A-~~3~~ 3 AW | 1.1 |
| Blank | 0.8 |
| | |
| Spike, % Recovery | 116% |

# CADMIUM

## GFAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
Proj. #: 10204
Date: 19-Feb-01

IDL = 0.2 µg/L
Postdig'n spike conc. = 5.0 µg/L

| Sample ID Client | FAL | Test Sol'n µg/L | Dig'te Conc µg/L | FV ml | Dil'n Factor | Total Volume ml | Volume Dig'd ml | | Total µg |
|---|---|---|---|---|---|---|---|---|---|
| **FRONT HALVES** | | | | | | | | | |
| Blank | 10204.B-1 | 0.06 | 0.06 | 100 | 1 | | | < | 0.02 |
| M29-1 | 10204.1-1 | 3.71 | 18.55 | 100 | 5 | | | | 1.86 |
| M29-2 | 10204.2-1 | 6.22 | 62.20 | 100 | 10 | | | | 6.22 |
| M29-3 | 10204.3-1 | 6.09 | 60.90 | 100 | 10 | | | | 6.09 |
| **BACK HALVES** | | | | | | | | | |
| Blank | 10204.B-2A | 0.05 | 0.05 | 100 | 1 | 238 | 188 | < | 0.03 |
| M29-1 | 10204.1-2A | 2.86 | 14.30 | 100 | 5 | 641 | 541 | | 1.69 |
| M29-1 | 10204.2-2A | 3.74 | 3.74 | 100 | 1 | 631 | 531 | | 0.44 |
| M29-3 | 10204.3-2A | 1.97 | 1.97 | 100 | 1 | 570 | 470 | | 0.24 |

| | | | | |
|---|---|---|---|---|
| FRONT SPIKE | 10204.1-1S | 8.78 | % REC = | 101.4% |
| BACK SPIKE | 10204.1-2AS | 8.09 | % REC = | 104.6% |

**Calibration Data**

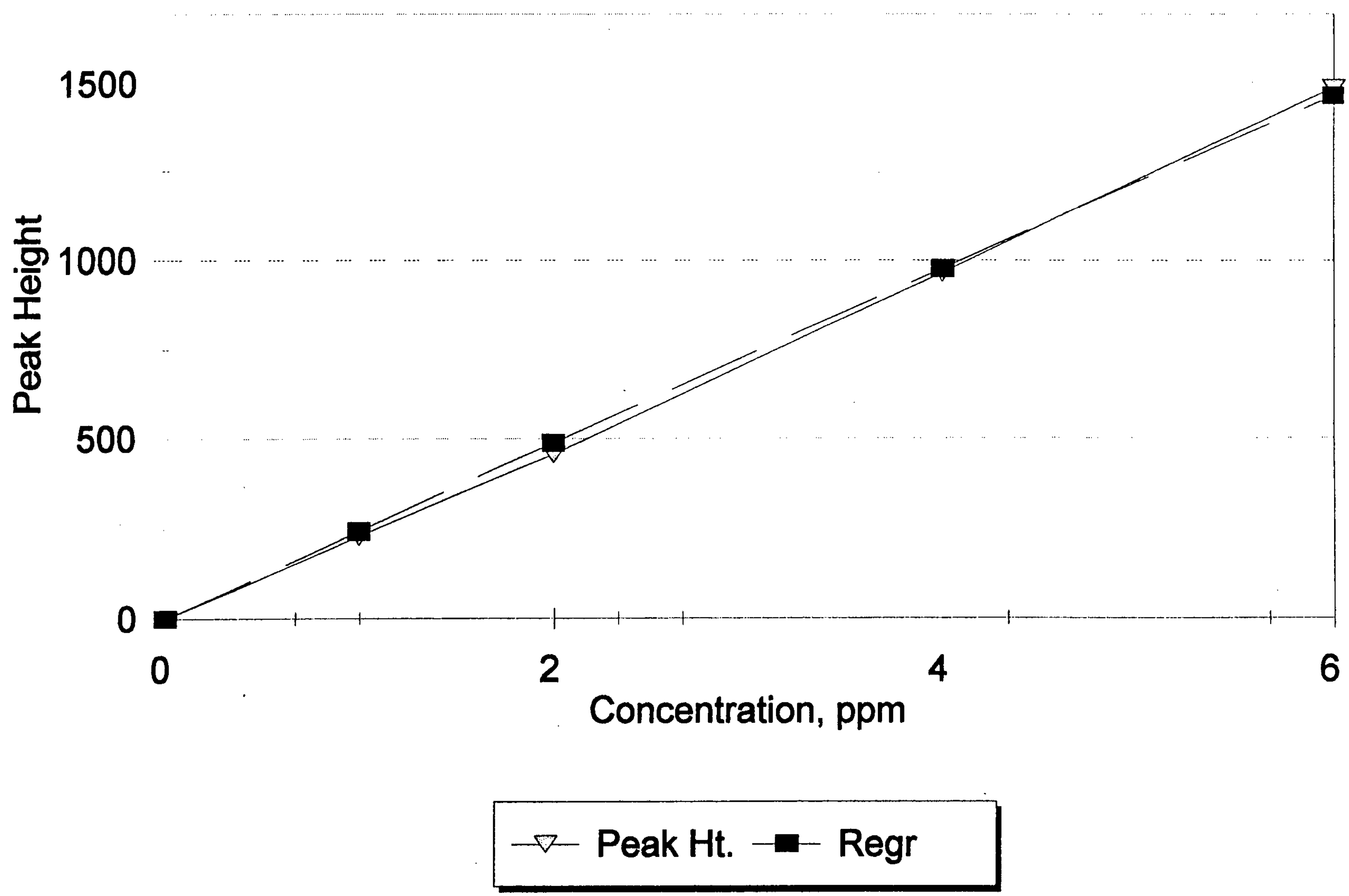
| | True conc., µg/L | Abs. |
|---|---|---|
| Blank | 0.0 | 0.000 |
| Standard 1 | 0.5 | 0.042 |
| Standard 2 | 2.0 | 0.150 |
| Standard 3 | 5.0 | 0.361 |
| Standard 4 | 10.0 | 0.644 |

Calibration Verifications

| | | | |
|---|---|---|---|
| ICV = 5 | 5.17 | CCV2 = 5 | 5.41 |
| ICB = 0 | 0.05 | CCB2 = 0 | 0.02 |
| CCV1 = 5 | 5.35 | | |
| CCB1 = 0 | 0.07 | | |

# Chloride Calibration

FAL 10204; 02/13/01



# LEAD
## GFAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
Proj. #: 10204
Date: 19-Feb-01

IDL = 5 µg/L
Postdig'n spike conc. = 100 µg/L

| Sample ID Client | FAL | Test Sol'n µg/L | Dig'te Conc µg/L | FV ml | Dil'n Factor | Total Volume ml | Volume Dig'd ml | | Total µg |
|---|---|---|---|---|---|---|---|---|---|
| **FRONT HALVES** | | | | | | | | | |
| Blank | 10204.B-1 | 3.3 | 3.3 | 100 | 1 | | | < | 0.5 |
| M29-1 | 10204.1-1 | 106.7 | 4268.0 | 100 | 40 | | | | 426.8 |
| M29-2 | 10204.2-1 | 137.6 | 5504.0 | 100 | 40 | | | | 550.4 |
| M29-3 | 10204.3-1 | 119.9 | 4796.0 | 100 | 40 | | | | 479.6 |
| **BACK HALVES** | | | | | | | | | |
| Blank | 10204.B-2A | 0.1 | 0.1 | 100 | 1 | 238 | 188 | < | 0.6 |
| M29-1 | 10204.1-2A | 59.8 | 59.8 | 100 | 1 | 641 | 541 | | 7.1 |
| M29-1 | 10204.2-2A | 36.8 | 36.8 | 100 | 1 | 631 | 531 | | 4.4 |
| M29-3 | 10204.3-2A | 9.9 | 9.9 | 100 | 1 | 570 | 470 | | 1.2 |
| FRONT SPIKE | 10204.1-1S | 206.9 | | | | % REC = | 100.2% | | |
| BACK SPIKE | 10204.1-2AS | 164.0 | | | | % REC = | 104.2% | | |

**Calibration Data**

| | True conc., µg/L | Abs. |
|---|---|---|
| Blank | 0.0 | 0.000 |
| Standard 1 | 10 | 0.031 |
| Standard 2 | 50 | 0.133 |
| Standard 3 | 100 | 0.254 |
| Standard 4 | 200 | 0.449 |

Calibration Verifications

| | | | |
|---|---|---|---|
| ICV = 100 | 103.2 | CCV2 = 100 | 106.0 |
| ICB = 0 | 1.1 | CCB2 = 0 | 1.0 |
| CCV1 = 100 | 104.5 | | |
| CCB1 = 0 | 0.7 | | |

# MERCURY

## CVAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
Proj. #: 10204
Date: 14-Feb-01

IDL = 0.2 µg/L
Postdig'n spike conc. = 5.0 µg/L

| Sample ID Client | FAL | Test Sol'n µg/L | Dig'te Conc µg/L | FV ml | Dil'n Factor | Volume ml | Digst'd Vol. ml | | Total µg |
|---|---|---|---|---|---|---|---|---|---|
| **FRONT HALVES** | | | | | | | | | |
| Blank | 10204.B-1 | -0.13 | -0.13 | 100 | 1 | 100 | 5 | < | 0.40 |
| M29-1 | 10204.1-1 | -0.10 | -0.10 | 100 | 1 | 100 | 5 | < | 0.40 |
| M29-2 | 10204.2-1 | -0.02 | -0.02 | 100 | 1 | 100 | 5 | < | 0.40 |
| M29-3 | 10204.3-1 | 0.16 | 0.16 | 100 | 1 | 100 | 5 | < | 0.40 |
| **FRACTIONS 2B** | | | | | | | | | |
| Blank | 10204.B-2B | -0.13 | -0.13 | 100 | 1 | 238 | 5 | < | 0.95 |
| M29-1 | 10204.1-2B | 2.75 | 2.75 | 100 | 1 | 641 | 3 | | 58.76 |
| M29-2 | 10204.2-2B | 0.31 | 0.31 | 100 | 1 | 631 | 5 | | 3.85 |
| M29-3 | 10204.3-2B | 0.18 | 0.18 | 100 | 1 | 570 | 5 | < | 2.28 |
| BACK SPK | 10204.1-2BS | 8.05 | | | | %REC = | 106.0% | | |
| **FRACTIONS 3A** | | | | | | | | | |
| Blank | 10204.B-3A | 0.11 | 0.11 | 100 | 1 | 50 | 10 | < | 0.10 |
| M29-1 | 10204.1-3A | 1.88 | 1.88 | 100 | 1 | 58 | 10 | | 1.09 |
| M29-2 | 10204.2-3A | 0.15 | 0.15 | 100 | 1 | 59 | 10 | < | 0.12 |
| M29-3 | 10204.3-3A | 0.27 | 0.27 | 100 | 1 | 39 | 10 | | 0.10 |
| **FRACTIONS 3B** | | | | | | | | | |
| Blank | 10204.B-3B | 0.07 | 0.07 | 100 | 1 | 118 | 20 | < | 0.12 |
| M29-1 | 10204.1-3B | 1.89 | 1.89 | 100 | 1 | 421 | 20 | | 3.98 |
| M29-2 | 10204.2-3B | 0.25 | 0.25 | 100 | 1 | 446 | 20 | | 0.56 |
| M29-3 | 10204.3-3B | 0.21 | 0.21 | 100 | 1 | 432 | 20 | | 0.45 |
| **FRACTIONS 3C** | | | | | | | | | |
| Blank | 10204.B-3C | 0.13 | 0.13 | 100 | 1 | 144 | 5 | < | 0.58 |
| M29-1 | 10204.1-3C | 1.62 | 1.62 | 100 | 1 | 284 | 5 | | 9.17 |
| M29-2 | 10204.2-3C | 0.17 | 0.17 | 100 | 1 | 281 | 5 | < | 1.12 |
| M29-3 | 10204.3-3C | 0.11 | 0.11 | 100 | 1 | 279 | 5 | < | 1.12 |

# MERCURY
## CVAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
Proj. #: 10204
Date: 14-Feb-01

**Calibration Data**

| | Run1 | |
|---|---|---|
| | Abs. | True conc., µg/L |
| Blank | 0.000 | 0.00 |
| Standard 1 | 0.007 | 0.50 |
| Standard 2 | 0.018 | 1.00 |
| Standard 3 | 0.044 | 2.00 |
| Standard 4 | 0.107 | 5.00 |
| Standard 5 | 0.208 | 10.00 |

Calibration Verifications

| | | | |
|---|---|---|---|
| ICV = 5 | 5.30 | CCV2 = 5 | 5.13 |
| ICB = 0 | -0.15 | CCB2 = 0 | -0.04 |
| CCV1 = 5 | 5.40 | CCV3 = 5 | 5.15 |
| CCB1 = 0 | -0.21 | CCB3 = 0 | 0.13 |

Element File: CD.GEL
Date: 02/09/81
Data File: 10204CD.DAT
Technique: HGA

Element: Cd
Time: 08:24
ID/Wt File: 10204.IDW
Calib. Type: Nonlinear

Wavelength: 228.8
Slit: 0.70 L
Lamp Current: 5
Energy: 42

Cd ID: BLANK Seq. No.: 00001 A/S Pos.: 0 Date: 02/09/8

Replicate 1
Peak Area (A-s): -0.001
Background Pk Area (A-s): 0.007
Blank Corrected Pk Area (A-s): -0.001

Time: 08:24
Peak Height (A): 0.019
Background Pk Height (A): 0.014

Replicate 2
Peak Area (A-s): -0.005
Background Pk Area (A-s): 0.056
Blank Corrected Pk Area (A-s): -0.005

Time: 08:28
Peak Height (A): 0.017
Background Pk Height (A): 0.031

Mean Pk Area (A-s): -0.003 SD: 0.0028 RSD(%): 83.54

Auto-zero performed.

Cd ID: 0.5 PPB CD Seq. No.: 00002 A/S Pos.: 1 Date: 02/09/8

Replicate 1
Peak Area (A-s): 0.038
Background Pk Area (A-s): 0.081
Blank Corrected Pk Area (A-s): 0.041

Time: 08:31
Peak Height (A): 0.083
Background Pk Height (A): 0.040

Replicate 2
Peak Area (A-s): 0.039
Background Pk Area (A-s): 0.086
Blank Corrected Pk Area (A-s): 0.043

Time: 08:34
Peak Height (A): 0.087
Background Pk Height (A): 0.043

Mean Pk Area (A-s): 0.042 SD: 0.0011 RSD(%): 2.74

Standard number 1 applied. [0.50]
Correlation coefficient: 1.00000 Slope: 0.0839

Cd ID: 2 PPB CD Seq. No.: 00003 A/S Pos.: 2 Date: 02/09/8

Replicate 1
Peak Area (A-s): 0.146
Background Pk Area (A-s): 0.110
Blank Corrected Pk Area (A-s): 0.150
Concentration (ug/L ): 1.78

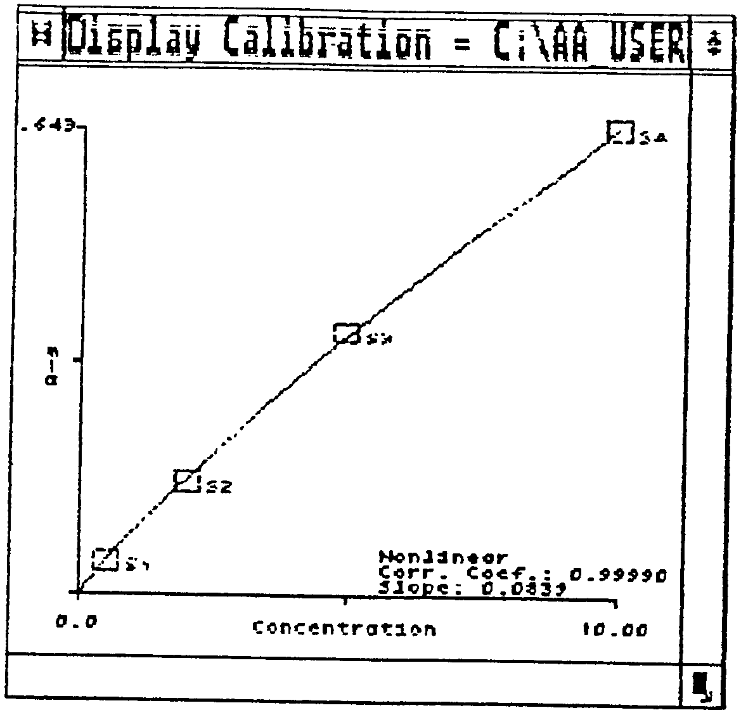
Time: 08:37
Peak Height (A): 0.280
Background Pk Height (A): 0.053

Replicate 2
Peak Area (A-s): 0.147
Background Pk Area (A-s): 0.111
Blank Corrected Pk Area (A-s): 0.150
Concentration (ug/L ): 1.79

Time: 08:40
Peak Height (A): 0.297
Background Pk Height (A): 0.045

Mean Conc (ug/L ): 1.79 SD: 0.005 RSD(%): 0.30

Standard number 2 applied. [2.00]




OK

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: ICV Seq. No.: 00006 A/S Pos.: 5 Date: 02/09/

Replicate 1 Time: 08:58
Concentration (ug/L ): 5.22

Replicate 2 Time: 09:01
Concentration (ug/L ): 5.11

Mean Conc (ug/L ): 5.17 SD: 0.084 RSD(%): 1.62

QC sample is within range

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: ICB Seq. No.: 00007 A/S Pos.: 0 Date: 02/09

Replicate 1 Time: 09:04
Concentration (ug/L ): 0.06

Replicate 2 Time: 09:08
Concentration (ug/L ): 0.03

Mean Conc (ug/L ): 0.05 SD: 0.020 RSD(%): 44.02

QC sample is within range

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.B-1 Seq. No.: 00008 A/S Pos.: 6 Date: 02/09

Replicate 1 Time: 09:11
Concentration (ug/L ): 0.04

Replicate 2 Time: 09:14
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Concentration (ug/L ): 0.08

Mean Conc (ug/L ): 0.06 SD: 0.029 RSD(%): 45.11

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.1-1 X20 Seq. No.: 00009 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:17
Concentration (ug/L ): 0.97 Corrected Conc (ug/L ): 19.4

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.1-1 X5 Seq. No.: 00010 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:25
Concentration (ug/L ): 3.64 Corrected Conc (ug/L ): 18.2

Replicate 2 Time: 09:28
Concentration (ug/L ): 3.78 Corrected Conc (ug/L ): 18.88

Mean Conc (ug/L ): 3.71 SD: 0.098 RSD(%): 2.65
Corrected Conc (ug/L ): 18.5

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.1-1 X5 Seq. No.: 00011 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:32
Concentration (ug/L ): 8.73 Corrected Conc (ug/L ): 43.7

Replicate 2 Time: 09:35
Concentration (ug/L ): 8.82 Corrected Conc (ug/L ): 44.1

Mean Conc (ug/L ): 8.78 SD: 0.062 RSD(%): 0.71
Corrected Conc (ug/L ): 43.9

Recovery is 101.4%

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.2-1 X5 Seq. No.: 00012 A/S Pos.: 8 Date: 02/09/

Sample abs. is greater than that of the largest standard.
Replicate 1 Time: 09:38
Concentration (ug/L ): 12.08 Corrected Conc (ug/L ): 60.4

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.2-1 X10 Seq. No.: 00014 A/S Pos.: 8 Date: 02/09/

Replicate 1 Time: 09:45
Concentration (ug/L ): 6.38 Corrected Conc (ug/L ): 63.8

Replicate 2 Time: 09:49
Concentration (ug/L ): 6.06 Corrected Conc (ug/L ): 60.6

Mean Conc (ug/L ): 6.22 SD: 0.223 RSD(%): 3.59
Corrected Conc (ug/L ): 62.2

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.3-1 X10 Seq. No.: 00015 A/S Pos.: 9 Date: 02/09/

Replicate 1 Time: 09:52
Concentration (ug/L ): 6.14 Corrected Conc (ug/L ): 61.4

Replicate 2 Time: 09:55
Concentration (ug/L ): 6.05 Corrected Conc (ug/L ): 60.5

Mean Conc (ug/L ): 6.09 SD: 0.061 RSD(%): 1.01
Corrected Conc (ug/L ): 60.9

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: CCV Seq. No.: 00016 A/S Pos.: 3 Date: 02/09

Replicate 1 Time: 09:59
Concentration (ug/L ): 5.30

Replicate 2 Time: 10:02
Concentration (ug/L ): 5.39

Mean Conc (ug/L ): 5.35 SD: 0.066 RSD(%): 1.23

QC sample is within range

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: CCB Seq. No.: 00017 A/S Pos.: 0 Date: 02/09

Replicate 1 Time: 10:05
Concentration (ug/L ): 0.04

Replicate 2 Time: 10:08
Concentration (ug/L ): 0.09

Mean Conc (ug/L ): 0.07 SD: 0.033 RSD(%): 50.2

QC sample is within range

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.B-2A Seq. No.: 00018 A/S Pos.: 10 Date: 02/09/

Replicate 1 Time: 10:11
Concentration (ug/L ): -0.07

Replicate 2 Time: 10:15
Concentration (ug/L ): 0.16

Mean Conc (ug/L ): 0.05 SD: 0.162 RSD(%): 342.

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.1-2A Seq. No.: 00019 A/S Pos.: 11 Date: 02/09

Sample abs. is greater than that of the largest standard.
Replicate 1 Time: 10:18
Concentration (ug/L ): 13.89

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.1-2A X5 Seq. No.: 00020 A/S Pos.: 11 Date: 02/0

Replicate 1 Time: 10:24
Concentration (ug/L ): 2.94 Corrected Conc (ug/L ): 14.7
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Replicate 2 Time: 10:28
Concentration (ug/L ): 2.79 Corrected Conc (ug/L ): 13.9

Mean Conc (ug/L ): 2.86 SD: 0.109 RSD(%): 3.81
Corrected Conc (ug/L ): 14.3

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.1-2A X5 Seq. No.: 00021 A/S Pos.: 11 Date: 02/09/

Replicate 1 Time: 10:31
Concentration (ug/L ): 8.14 Corrected Conc (ug/L ): 40.7

Replicate 2 Time: 10:34
Concentration (ug/L ): 8.04 Corrected Conc (ug/L ): 40.2

Mean Conc (ug/L ): 8.09 SD: 0.067 RSD(%): 0.83
Corrected Conc (ug/L ): 40.5

Recovery is 104.5%

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.2-2A X5 Seq. No.: 00022 A/S Pos.: 12 Date: 02/09/

Replicate 1 Time: 10:37
Concentration (ug/L ): 0.78 Corrected Conc (ug/L ): 3.9

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.2-2A Seq. No.: 00023 A/S Pos.: 12 Date: 02/09/

Replicate 1 Time: 10:41
Concentration (ug/L ): 3.62

Replicate 2 Time: 10:45
Concentration (ug/L ): 3.86

Mean Conc (ug/L ): 3.74 SD: 0.170 RSD(%): 4.54

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: 10204.3-2A Seq. No.: 00024 A/S Pos.: 13 Date: 02/09/

Replicate 1 Time: 10:48
Concentration (ug/L ): 2.05

Replicate 2 Time: 10:51
Concentration (ug/L ): 1.90

Mean Conc (ug/L ): 1.97 SD: 0.106 RSD(%): 5.39

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: CCV Seq. No.: 00025 A/S Pos.: 3 Date: 02/09/

Replicate 1 Time: 10:54
Concentration (ug/L ): 5.43

Replicate 2 Time: 10:57
Concentration (ug/L ): 5.39

Mean Conc (ug/L ): 5.41 SD: 0.031 RSD(%): 0.57
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

QC sample is within range

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Cd ID: CCB Seq. No.: 00026 A/S Pos.: 0 Date: 02/09

Replicate 1 Time: 11:01
Concentration (ug/L ): 0.06

Replicate 2 Time: 11:04
Concentration (ug/L ): -0.03

Mean Conc (ug/L ): 0.02 SD: 0.062 RSD(%): 408.

QC sample is within range
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

| | | |
|---|---|---|
| Element File: PB.GEL | Element: Pb | Wavelength: 283.3 |
| Date: 02/08/81 | Time: 07:59 | Slit: 0.70 L |
| Data File: | ID/Wt File: 20203.IDW | Lamp Current: 10 |
| Technique: HGA | Calib. Type: Nonlinear | Energy: 47 |

Pb ID: BLANK Seq. No.: 00001 A/S Pos.: 0 Date: 02/08/8

Replicate 1 Time: 07:59
Peak Area (A-s): 0.002 Peak Height (A): 0.014
Background Pk Area (A-s): 0.039 Background Pk Height (A): 0.044
Blank Corrected Pk Area (A-s): 0.002

Replicate 2 Time: 08:02
Peak Area (A-s): 0.000 Peak Height (A): 0.016
Background Pk Area (A-s): 0.025 Background Pk Height (A): 0.032
Blank Corrected Pk Area (A-s): 0.000

Mean Pk Area (A-s): 0.001 SD: 0.0010 RSD(%): 88.39

Auto-zero performed.

Pb ID: 10 PPB PB Seq. No.: 00002 A/S Pos.: 1 Date: 02/08/8

Replicate 1 Time: 08:06
Peak Area (A-s): 0.033 Peak Height (A): 0.064
Background Pk Area (A-s): 0.058 Background Pk Height (A): 0.122
Blank Corrected Pk Area (A-s): 0.031

Replicate 2 Time: 08:09
Peak Area (A-s): 0.032 Peak Height (A): 0.083
Background Pk Area (A-s): 0.027 Background Pk Height (A): 0.039
Blank Corrected Pk Area (A-s): 0.031

Mean Pk Area (A-s): 0.031 SD: 0.0002 RSD(%): 0.52

Standard number 1 applied. [10.0]
Correlation coefficient: 1.00000 Slope: 0.0031

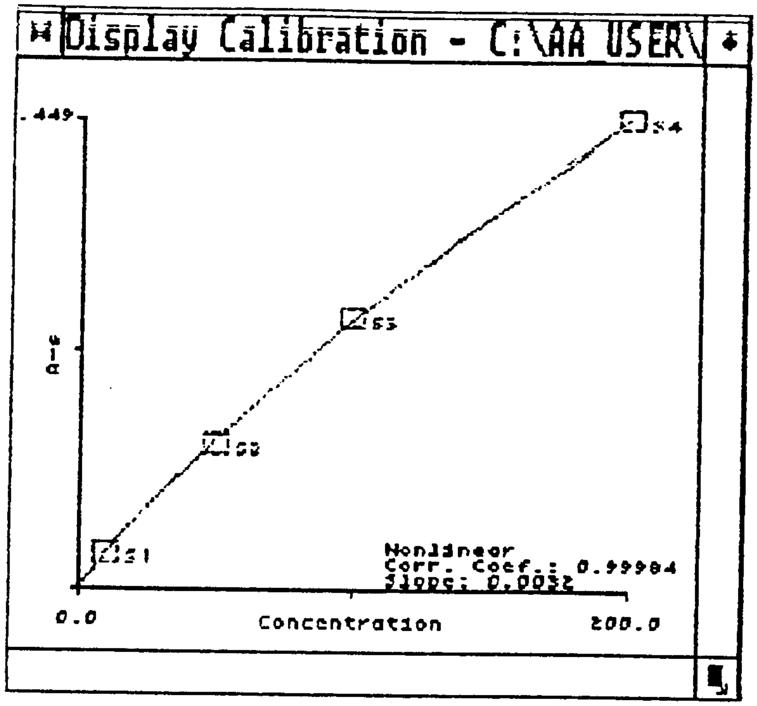
Pb ID: 50 PPB PB Seq. No.: 00003 A/S Pos.: 2 Date: 02/08/

Replicate 1 Time: 08:12
Peak Area (A-s): 0.134 Peak Height (A): 0.333
Background Pk Area (A-s): 0.050 Background Pk Height (A): 0.071
Blank Corrected Pk Area (A-s): 0.133
Concentration (ug/L ): 42.4

Replicate 2 Time: 08:16
Peak Area (A-s): 0.133 Peak Height (A): 0.329
Background Pk Area (A-s): 0.050 Background Pk Height (A): 0.072
Blank Corrected Pk Area (A-s): 0.132
Concentration (ug/L ): 42.3

Mean Conc (ug/L ): 42.3 SD: 0.03 RSD(%): 0.08

Standard number 2 applied. [50.0]




OK

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: ICV Seq. No.: 00008 A/S Pos.: 5 Date: 02/08/(

Replicate 1 Time: 08:45
Concentration (ug/L ): 99.7

Replicate 2 Time: 08:48
Concentration (ug/L ): 106.7

Mean Conc (ug/L ): 103.2 SD: 4.93 RSD(%): 4.77

QC sample is within range 79.5 - 120.49

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: ICB Seq. No.: 00009 A/S Pos.: 0 Date: 02/0E (

Replicate 1 Time: 08:52
Concentration (ug/L ): 1.7

Replicate 2 Time: 08:55
Concentration (ug/L ): 0.5

Mean Conc (ug/L ): 1.1 SD: 0.83 RSD(%): 74.89

QC sample is within range -5.49 - 5.49

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: ~~2~~0203.LB1 Seq. No.: 00010 A/S Pos.: 6 Date: 02/0E (

1 ALL ↓

Replicate 1 Time: 08:58
Concentration (ug/L ): 1.1

Replicate 2 Time: 09:02
Concentration (ug/L ): 1.1
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Concentration (ug/L ): 144.8

Replicate 2 Time: 14:57
Concentration (ug/L ): 144.1

Mean Conc (ug/L ): 144.5 SD: 0.48 RSD(%): 0.33

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 20203.30-3 Seq. No.: 00064 A/S Pos.: 26 Date: 02/08/8

Replicate 1 Time: 15:01
Concentration (ug/L ): 142.4

Replicate 2 Time: 15:04
Concentration (ug/L ): 143.5

Mean Conc (ug/L ): 143.0 SD: 0.77 RSD(%): 0.54

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 20203.30-4 Seq. No.: 00065 A/S Pos.: 27 Date: 02/08/8

Replicate 1 Time: 15:07
Concentration (ug/L ): 153.3

Replicate 2 Time: 15:11
Concentration (ug/L ): 152.1

Mean Conc (ug/L ): 152.7 SD: 0.84 RSD(%): 0.55

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 20203.30-6 Seq. No.: 00066 A/S Pos.: 28 Date: 02/08/8

Replicate 1 Time: 15:14
Concentration (ug/L ): 137.5

Replicate 2 Time: 15:17
Concentration (ug/L ): 136.8

Mean Conc (ug/L ): 137.2 SD: 0.50 RSD(%): 0.37

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 20203.30-7 Seq. No.: 00067 A/S Pos.: 29 Date: 02/08/8

Replicate 1 Time: 15:21
Concentration (ug/L ): 3.0

Replicate 2 Time: 15:24
Concentration (ug/L ): 1.3

Mean Conc (ug/L ): 2.1 SD: 1.19 RSD(%): 56.46

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: CCV Seq. No.: 00068 A/S Pos.: 3 Date: 02/08/8

Replicate 1 Time: 15:27
Concentration (ug/L ): 104.3

Replicate 2 Time: 15:31
Concentration (ug/L ): 104.8
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Mean Conc (ug/L ): 104.5 SD: 0.34 RSD(%): 0.33

QC sample is within range 79.5 - 120.49

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: CCB Seq. No.: 00069 A/S Pos.: 0 Date: 02/08/8

Replicate 1 Time: 15:34
Concentration (ug/L ): 1.2

Replicate 2 Time: 15:38
Concentration (ug/L ): 0.3

Mean Conc (ug/L ): 0.7 SD: 0.65 RSD(%): 90.37

QC sample is within range -5.49 - 5.49

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.B-1 Seq. No.: 00070 A/S Pos.: 6 Date: 02/08/8

Replicate 1 Time: 15:44
Concentration (ug/L ): 3.1

Replicate 2 Time: 15:48
Concentration (ug/L ): 3.4

Mean Conc (ug/L ): 3.3 SD: 0.22 RSD(%): 6.64

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.1-1 X20 Seq. No.: 00071 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 15:51
Concentration (ug/L ): 204.6 Corrected Conc (ug/L ): 4092.

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.1-1 X40 Seq. No.: 00072 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 15:57
Concentration (ug/L ): 108.1 Corrected Conc (ug/L ): 4322.

Replicate 2 Time: 16:00
Concentration (ug/L ): 105.4 Corrected Conc (ug/L ): 4216.

Mean Conc (ug/L ): 106.7 SD: 1.88 RSD(%): 1.76
Corrected Conc (ug/L ): 4269.

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.1-1 X40 Seq. No.: 00073 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 16:04
Concentration (ug/L ): 209.8 Corrected Conc (ug/L ): 8390.

Replicate 2 Time: 16:07
Concentration (ug/L ): 204.1 Corrected Conc (ug/L ): 8164.

Mean Conc (ug/L ): 206.9 SD: 3.99 RSD(%): 1.93
Corrected Conc (ug/L ): 8277.

Recovery is 100.2%
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.2-1 X40 Seq. No.: 00074 A/S Pos.: 8 Date: 02/08/8

Replicate 1 Time: 16:11
Concentration (ug/L ): 138.2 Corrected Conc (ug/L ): 5529.

Replicate 2 Time: 16:14
Concentration (ug/L ): 137.0 Corrected Conc (ug/L ): 5480.

Mean Conc (ug/L ): 137.6 SD: 0.86 RSD(%): 0.63
Corrected Conc (ug/L ): 5505.

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.3-1 X40 Seq. No.: 00075 A/S Pos.: 9 Date: 02/08/8

Replicate 1 Time: 16:17
Concentration (ug/L ): 121.6 Corrected Conc (ug/L ): 4863.

Replicate 2 Time: 16:21
Concentration (ug/L ): 118.3 Corrected Conc (ug/L ): 4731.

Mean Conc (ug/L ): 119.9 SD: 2.34 RSD(%): 1.95
Corrected Conc (ug/L ): 4797.

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.B-2A Seq. No.: 00076 A/S Pos.: 10 Date: 02/08/8

Replicate 1 Time: 16:24
Concentration (ug/L ): 0.7

Replicate 2 Time: 16:27
Concentration (ug/L ): -0.4

Mean Conc (ug/L ): 0.1 SD: 0.77 RSD(%): 595.48

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.1-2A Seq. No.: 00077 A/S Pos.: 11 Date: 02/08/8

Replicate 1 Time: 16:31
Concentration (ug/L ): 59.2

Replicate 2 Time: 16:34
Concentration (ug/L ): 60.3

Mean Conc (ug/L ): 59.8 SD: 0.82 RSD(%): 1.38

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.1-2A Seq. No.: 00078 A/S Pos.: 11 Date: 02/08/8

Replicate 1 Time: 16:38
Concentration (ug/L ): 165.0

Replicate 2 Time: 16:41
Concentration (ug/L ): 163.0

Mean Conc (ug/L ): 164.0 SD: 1.45 RSD(%): 0.88

Recovery is 104.3%
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.2-2A Seq. No.: 00079 A/S Pos.: 12 Date: 02/08/8

Replicate 1 Time: 16:44
Concentration (ug/L ): 37.5

Replicate 2 Time: 16:48
Concentration (ug/L ): 36.0

Mean Conc (ug/L ): 36.8 SD: 1.08 RSD(%): 2.94

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: 10204.3-2A Seq. No.: 00080 A/S Pos.: 13 Date: 02/08/8

Replicate 1 Time: 16:51
Concentration (ug/L ): 10.4

Replicate 2 Time: 16:54
Concentration (ug/L ): 9.4

Mean Conc (ug/L ): 9.9 SD: 0.69 RSD(%): 6.99

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: CCV Seq. No.: 00081 A/S Pos.: 3 Date: 02/08/8

Replicate 1 Time: 16:58
Concentration (ug/L ): 105.2

Replicate 2 Time: 17:01
Concentration (ug/L ): 106.7

Mean Conc (ug/L ): 106.0 SD: 1.05 RSD(%): 0.99

QC sample is within range 79.5 - 120.49

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Pb ID: CCB Seq. No.: 00082 A/S Pos.: 0 Date: 02/08/8

Replicate 1 Time: 17:04
Concentration (ug/L ): 1.9

Replicate 2 Time: 17:08
Concentration (ug/L ): 0.2

Mean Conc (ug/L ): 1.0 SD: 1.24 RSD(%): 119.0

QC sample is within range -5.49 - 5.49

====================================================================

HG AA-BG BG
MAIN: 0.004 PA-0.011 -0.220
PH 0.004 -0.001

====================================================================

0.000 AUTOZERO

====================================================================

HG AA-BG BG
MAIN: 0.007 PA 0.200 0.191
PH 0.007 0.003

====================================================================

0.50 1.STANDARD

====================================================================

HG AA-BG BG
MAIN: 1.32 UG/L PA 0.435 0.188
PH 0.018 0.002

====================================================================

E61 Sample concentration greater than highest standard

====================================================================

1.04 2.STANDARD

====================================================================

HG AA-BG BG
MAIN: 2.54 UG/L PA 0.961 0.190
PH 0.044 0.002

====================================================================

E61 Sample concentration greater than highest standard

====================================================================

2.09 3.STANDARD

====================================================================

HG AA-BG BG
MAIN: 5.09 UG/L PA 2.214 0.173
PH 0.107 0.001

====================================================================

E61 Sample concentration greater than highest standard

====================================================================

5.01 4.STANDARD

====================================================================

HG AA-BG BG
MAIN: 9.75 UG/L PA 4.273 0.232
PH 0.208 0.004

====================================================================

E61 Sample concentration greater than highest standard

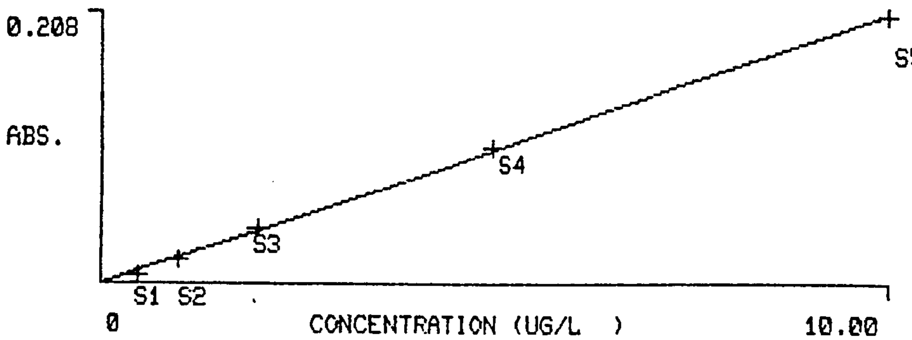
====================================================================

9.94 5.STANDARD

HGA DISPLAY CALIBRATION MODE
ELEMENT: HG - PEAK HEIGHT

PRINTER: ON
BG CORR: ON
UNITS : UG/L
CH.MASS:

# 9.94




READ
PEAK AREA (A-S)
AA-BG: 4.273
BG: 0.232

PEAK HEIGHT (A)
AA-BG: 0.208
BG: 0.004

| Note | Sample | HG MAIN | | AA-BG | BG | Sample | HG MAIN | | AA-BG | BG |
|---|---|---|---|---|---|---|---|---|---|---|
| | ICV | 5.30 UG/L | PA | 2.157 | 0.244 | ICB | -0.15 UG/L | PA | -0.021 | 0.208 |
| | | | PH | 0.111 | 0.004 | | | PH | -0.003 | 0.002 |
| 5 ml | B-2B | -0.13 UG/L | PA | -0.015 | 0.183 | | -0.13 UG/L | PA | 0.003 | 0.217 |
| | | | PH | -0.003 | 0.000 | | | PH | -0.003 | 0.002 |
| 3 ml | 1-2B | 2.73 UG/L | PA | 1.150 | 0.241 | | 2.77 UG/L | PA | 1.217 | 0.235 |
| | | | PH | 0.057 | 0.004 | | | PH | 0.058 | 0.003 |
| " | 1-2BS | 8.01 UG/L | PA | 3.245 | 0.243 | | 8.09 UG/L | PA | 3.301 | 0.223 |
| | | | PH | 0.168 | 0.003 | | | PH | 0.170 | 0.004 |
| 5 ml | 2-2B | 0.38 UG/L | PA | 0.165 | 0.152 | | 0.23 UG/L | PA | 0.161 | 0.226 |
| | | | PH | 0.008 | 0.000 | | | PH | 0.005 | 0.003 |
| | 3-2B | 0.21 UG/L | PA | 0.143 | 0.238 | | 0.15 UG/L | PA | 0.141 | 0.176 |
| | | | PH | 0.004 | 0.003 | | | PH | 0.003 | 0.001 |
| | B-1 | -0.13 UG/L | PA | -0.026 | 0.244 | | -0.13 UG/L | PA | 0.010 | 0.215 |
| | | | PH | -0.003 | 0.003 | | | PH | -0.003 | 0.002 |
| | 1-1 | -0.10 UG/L | PA | 0.022 | 0.239 | | -0.10 UG/L | PA | 0.020 | 0.239 |
| | | | PH | -0.002 | 0.003 | | | PH | -0.002 | 0.003 |
| | 2-1 | -0.10 UG/L | PA | -0.009 | 0.260 | CCV | 5.40 UG/L | PA | 2.297 | 0.222 |
| | | | PH | -0.002 | 0.004 | | | PH | 0.113 | 0.002 |
| | CCB | -0.21 UG/L | PA | -0.035 | 0.148 | | | | | |
| | | | PH | -0.004 | 0.002 | | | | | |

0.00 AUTOZERO

| | HG | MAIN | PA AA-BG | PA BG | PH AA-BG | PH BG | HG | MAIN | PA AA-BG | PA BG | PH AA-BG | PH BG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 ml | 2-1 | 0.06 UG/L | 0.042 | 0.101 | 0.001 | 0.002 | 3-1 | 0.21 UG/L | 0.114 | 0.058 | 0.004 | -0.000 |
| 11 | 3-1 | 0.11 UG/L | 0.080 | 0.070 | 0.002 | 0.001 | | | | | | |
| 10 ml | B-3A | 0.11 UG/L | 0.042 | 0.083 | 0.002 | 0.003 | | 0.10 UG/L | 0.029 | -0.038 | 0.002 | -0.002 |
| | 1-3A | 1.85 UG/L | 0.746 | 0.114 | 0.039 | 0.002 | | 1.91 UG/L | 0.802 | 0.107 | 0.040 | 0.000 |
| | 2-3A | 0.15 UG/L | 0.052 | 0.101 | 0.003 | 0.000 | | 0.15 UG/L | 0.076 | 0.102 | 0.003 | 0.000 |
| | 3-3A | 0.19 UG/L | 0.094 | 0.090 | 0.004 | -0.000 | | 0.34 UG/L | 0.114 | 0.014 | 0.007 | 0.000 |
| 20 ml | B-3B | 0.02 UG/L | 0.034 | 0.088 | 0.000 | -0.000 | | 0.11 UG/L | 0.036 | 0.089 | 0.002 | 0.000 |
| | 1-3B | 1.95 UG/L | 0.773 | 0.073 | 0.041 | 0.002 | | 1.83 UG/L | 0.742 | 0.136 | 0.038 | 0.002 |
| | CCV | 5.13 UG/L | 2.166 | -0.056 | 0.108 | 0.006 | CCB | -0.04 UG/L | -0.004 | 0.016 | -0.001 | 0.004 |
| | 2-3B | 0.29 UG/L | 0.122 | -0.208 | 0.006 | -0.000 | | 0.21 UG/L | 0.115 | -0.092 | 0.004 | 0.003 |
| | 3-3B | 0.23 UG/L | 0.106 | -0.254 | 0.005 | 0.003 | | 0.19 UG/L | 0.077 | -0.220 | 0.004 | -0.000 |
| 5 ml | B-3C | 0.06 UG/L | 0.022 | -0.648 | 0.001 | -0.001 | | 0.19 UG/L | 0.058 | -0.106 | 0.004 | 0.024 |
| | 1-3C | 1.55 UG/L | 0.682 | -0.195 | 0.032 | -0.001 | | 1.68 UG/L | 0.687 | -0.359 | 0.035 | 0.016 |
| | 2-3C | 0.17 UG/L | 0.084 | -0.488 | 0.004 | 0.012 | | 0.17 UG/L | 0.074 | 0.011 | 0.004 | 0.003 |
| | 3-3C | 0.13 UG/L | 0.041 | -0.265 | 0.003 | 0.013 | | 0.08 UG/L | 0.019 | 0.004 | 0.002 | 0.000 |

| HG | CCV | | AA-BG | BG | HG | CCB | | AA-BG | BG |
|---|---|---|---|---|---|---|---|---|---|
| MAIN: | 5.15 UG/L | PA | 2.200 | 0.026 | MAIN: | 0.13 UG/L | PA | 0.054 | 0.056 |
| | | PH | 0.108 | 0.003 | | | PH | 0.003 | 0.000 |

**Appendix C.2**

**Analytical Data**

**Dioxins/Furans (M23)**

ALTA ANALYTICAL PERSPECTIVES

25 FEB 2001

Michael Maret
PES
5001 South Miami Blvd
Research Triangle Park, NC 27703

Ph.: 919-941-0333
Fax: 919-941-0234

Dear Mike;

Attached to this narrative are the analytical results you requested on samples submitted for the determination of polychlorinated dibenzo-*p*-dioxins and dibenzofurans. The insert below summarizes the relevant information pertaining to your project. In particular, the QC annotations bring to your attention specific analytical observations and assessments made during the sample handling and data interpretation phases. A brief description of the report's components is provided on the next page.

| | |
|---|---|
| **Your Project No.:** | **F181.001** |
| **AAP Project No.:** | **P1388** |
| **Analytical Protocol:** | **Method 23** |
| **No. of Samples Submitted:** | **4 (RB on hold)** |
| **No. of Samples Analyzed:** | **3** |
| **No. of Lab Method Blanks (MB):** | **1** |
| **No. of OPRs:** | **1** |

**QC Annotations:**

1. The data meet QA/QC requirements.
2. An "A" data qualifier is used for analytes with a concentration falling below the calibration curve.
3. Sample "M23-1" required additional cleanup to produce data of acceptable quality.

Alta Analytical Perspectives remains committed to serving you in the most effective manner. Should you have any questions or need additional information and technical support, please, do not hesitate to contact us at the telephone numbers shown below. We wanted to thank you for choosing Alta Analytical Perspectives as part of your analytical support team.

Sincerely,

Yves Tondeur, Ph.D.

2714 Exchange Drive
Wilmington
North Carolina 28405
Tel.: 910-794-1613 Fax: 910-794-3919

P1388

ALTA ANALYTICAL PERSPECTIVES

**Part 1**
**Narrative**

- ☑ Letter
- ☑ QC Annotations
- ☑ Project Information

ALTA ANALYTICAL PERSPECTIVES

**Part 2**
**Path**

- ☑ Overview
- ☑ Protocol
- ☑ Extraction
- ☑ Analysis
- ☑ Spike Profile
- ☑ SOPs
- ☑ QC
- ☑ Reporting
- ☑ Special Requirements

**Extraction** Tracking Sheets

**Fractionation** Tracking Sheets

**Injection** Tracking Sheets

ALTA ANALYTICAL PERSPECTIVES

**Part 3**
**Results**

- ☑ Summary Topsheets
- ☑ Raw Data
- ☑ SICPs
- ☑ Areas
- ☑ Retention Times
- ☑ S/N
- ☑ Ion Abundance Ratios

ALTA ANALYTICAL PERSPECTIVES

**Part 4**
**Performance**

- ☑ System Checks
- ☑ Mass Spectrometry
- ☑ Gas Chromatography
- ☑ Initial Calibration
- ☑ Continuing Calibration
- ☑ OPR

**Part 4** GC, MS, ConCal

**Part 4D** ICal

**Part 4E** OPR

## REPORTING PLATFORMS

**LEVEL I:**
① PART 1
② SUMMARY TOPSHEETS
③ COC

**LEVEL II:**
① PARTS 1, 2, 3, 4
② WITH ICAL SUMMARY

**LEVEL III:**
① PARTS 1, 2, 3, 4
② WITH COMPLETE RAW DATA FOR ICAL

**PLATINUM:**
① PARTS 1, 2, 3, 4
② WITH COMPLETE RAW DATA FOR ICAL
③ ON-GOING PRECISION & ACCURACY DATA

# Sample Summary

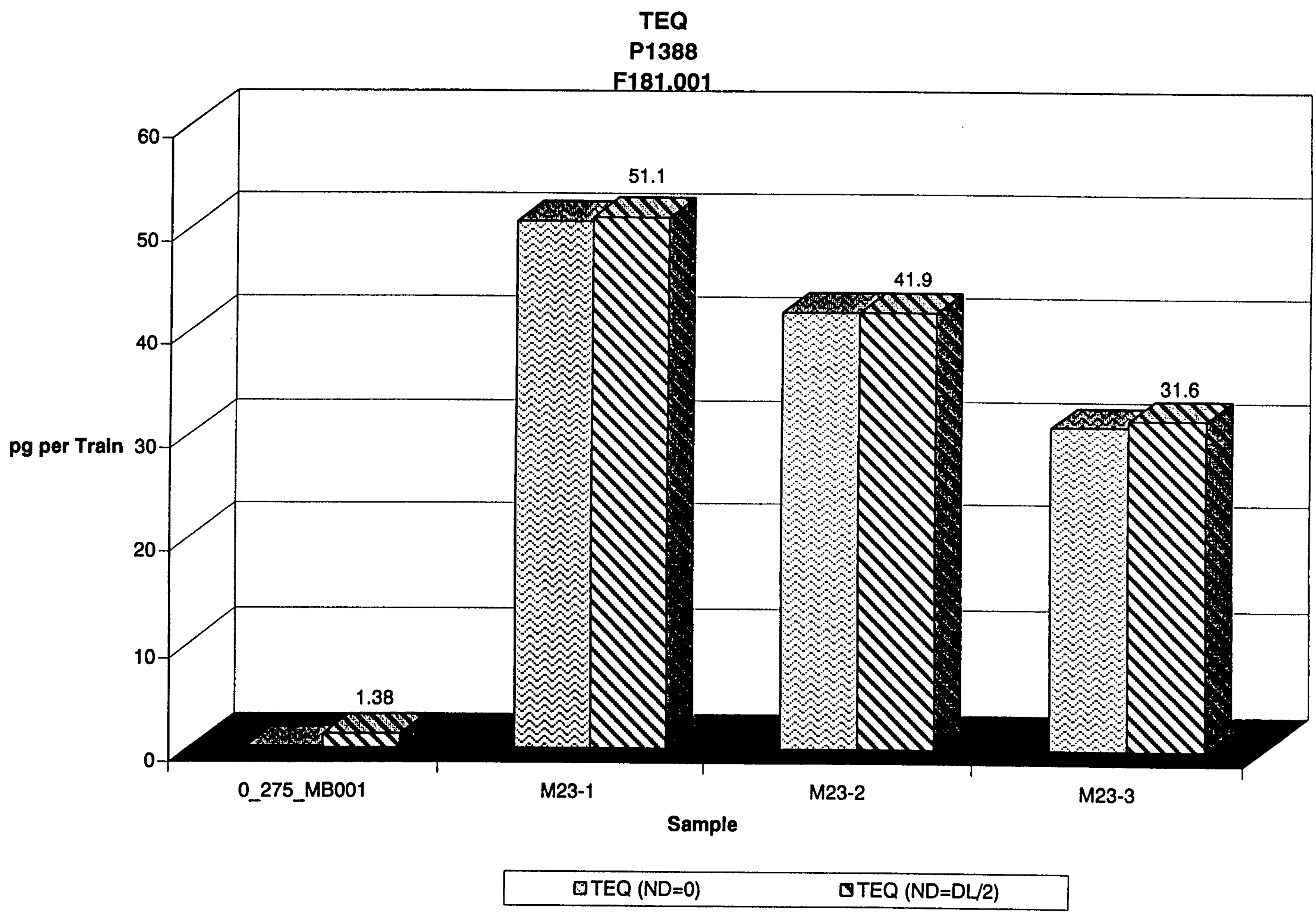
ALTA ANALYTICAL PERSPECTIVES

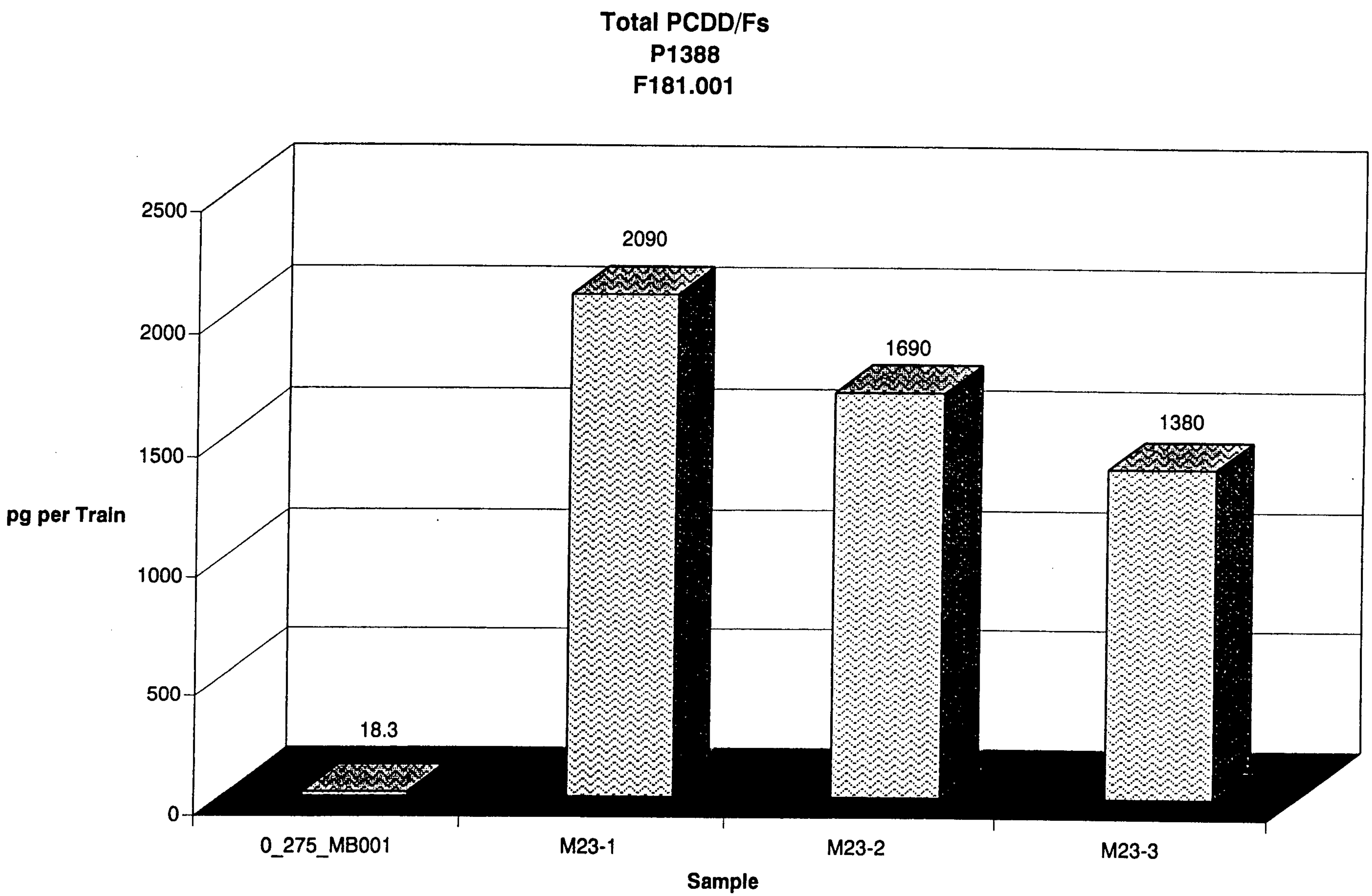
# Method M23

| Analyte | 0_275_MB001 | M23-1 | M23-2 | M23-3 |
|---|---|---|---|---|
| | pg | pg | pg | pg |
| 2,3,7,8-TCDD | [1.29] | (0.792) | 0.945 | (0.58) |
| 1,2,3,7,8-PeCDD | (0.997) | [1.74] | 2.44 | (1.63) |
| 1,2,3,4,7,8-HxCDD | (1.68) | 4.56 | [1.96] | 2.54 |
| 1,2,3,6,7,8-HxCDD | (1.87) | 7.58 | [5.04] | 4.63 |
| 1,2,3,7,8,9-HxCDD | (1.68) | 4.64 | 2.76 | [2.25] |
| 1,2,3,4,6,7,8-HpCDD | [1.9] | 27.3 | 21.5 | 20.5 |
| OCDD | 12.9 | 74.4 | 57.1 | 63.3 |
| 2,3,7,8-TCDF | (1.27) | 11.3 | 8.77 | 7.39 |
| 1,2,3,7,8-PeCDF | (1.84) | 20.9 | 15.2 | 11.6 |
| 2,3,4,7,8-PeCDF | (1.81) | 46.6 | 36.1 | 26.5 |
| 1,2,3,4,7,8-HxCDF | 1.69 | 48.9 | 40 | 28.9 |
| 1,2,3,6,7,8-HxCDF | (0.552) | 54.6 | 45.7 | 35.5 |
| 2,3,4,6,7,8-HxCDF | (0.586) | 87.3 | 73.7 | 60.2 |
| 1,2,3,7,8,9-HxCDF | (0.67) | 13.7 | 11.1 | 8.99 |
| 1,2,3,4,6,7,8-HpCDF | 1.86 | 234 | 208 | 172 |
| 1,2,3,4,7,8,9-HpCDF | (2.03) | 26.5 | 22.2 | 18.8 |
| OCDF | (2.83) | 145 | 118 | 113 |
| **Totals & TEQs** | | | | |
| TCDDs | ND | 17.3 | 13 | 3.93 |
| PeCDDs | ND | 41.3 | 31.3 | 18.8 |
| HxCDDs | ND | 68.2 | 42.9 | 38.9 |
| HpCDDs | 1.83 | 55.6 | 44.4 | 41.5 |
| TCDFs | ND | 345 | 265 | 205 |
| PeCDFs | ND | 451 | 354 | 277 |
| HxCDFs | 1.69 | 517 | 441 | 345 |
| HpCDFs | 1.86 | 370 | 328 | 274 |
| **Total PCDD/Fs** | **18.3** | **2090** | **1690** | **1380** |
| **TEQ (ND=0)** | **0.200** | **50.7** | **41.9** | **30.9** |
| **TEQ (ND=DL/2)** | **1.38** | **51.1** | **41.9** | **31.6** |

( ) = DL
[ ] = EMPC

Reviewer CL
Date 25 Feb 01


TEQ
P1388
F181.001
pg per Train
60
50
40
30
20
10
0
51.1
41.9
31.6
1.38
0_275_MB001
M23-1
M23-2
M23-3
Sample
TEQ (ND=0)
TEQ (ND=DL/2)



Total PCDD/Fs
P1388
F181.001
pg per Train
2500
2000
1500
1000
500
0
18.3
2090
1690
1380
0_275_MB001
M23-1
M23-2
M23-3
Sample

# Sample ID: 0_275_MB001 — Method M23

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | PES | Matrix: | Air | Project No.: | P1388 | Date Received: | n/a |
| Project ID: | F181.001 | Weight/Volume: | 1 | Sample ID: | 0_275_MB001 | Date Extracted: | 8-Feb-01 |
| Date Collected: | n/a | | | QC Batch No.: | 275 | Date Analyzed: | 14-FEB-01 |

| Analyte | Conc. | DL | EMPC | Qualifier | Recoveries | | |
|---|---|---|---|---|---|---|---|
| | pg | pg | pg | | IS | SS | AS |
| 2,3,7,8-TCDD | EMPC | | 1.29 | A | 99.6 | 98.2 | 85.4 |
| 1,2,3,7,8-PeCDD | ND | 0.997 | | | 100 | 96.4 | 85.4 |
| 1,2,3,4,7,8-HxCDD | ND | 1.68 | | | 100 | 97.1 | 85.4 |
| 1,2,3,6,7,8-HxCDD | ND | 1.87 | | | 100 | 97.1 | 85.4 |
| 1,2,3,7,8,9-HxCDD | ND | 1.68 | | | 100 | 97.1 | 85.4 |
| 1,2,3,4,6,7,8-HpCDD | EMPC | | 1.9 | A | 100 | 99.1 | 85.4 |
| OCDD | 12.9 | | | A | 95.7 | 99.1 | 85.4 |
| 2,3,7,8-TCDF | ND | 1.27 | | | 100 | 98.2 | 85.4 |
| 1,2,3,7,8-PeCDF | ND | 1.84 | | | 93.6 | 96.4 | 85.4 |
| 2,3,4,7,8-PeCDF | ND | 1.81 | | | 93.6 | 96.4 | 85.4 |
| 1,2,3,4,7,8-HxCDF | 1.69 | | | A | 86.5 | 97.3 | 85.4 |
| 1,2,3,6,7,8-HxCDF | ND | 0.552 | | | 86.5 | 97.3 | 85.4 |
| 2,3,4,6,7,8-HxCDF | ND | 0.586 | | | 86.5 | 97.3 | 85.4 |
| 1,2,3,7,8,9-HxCDF | ND | 0.67 | | | 86.5 | 97.3 | 85.4 |
| 1,2,3,4,6,7,8-HpCDF | 1.86 | | | A | 88 | 99.1 | 85.4 |
| 1,2,3,4,7,8,9-HpCDF | ND | 2.03 | | | 88 | 99.1 | 85.4 |
| OCDF | ND | 2.83 | | | 91 | 99.1 | 85.4 |

| **Totals & TEQs** | | | | |
|---|---|---|---|---|
| TCDDs | ND | | 1.29 | |
| PeCDDs | ND | 0.997 | | |
| HxCDDs | ND | 1.74 | | |
| HpCDDs | 1.83 | | 3.73 | |
| TCDFs | ND | 1.27 | | |
| PeCDFs | ND | 1.83 | | |
| HxCDFs | 1.69 | | | |
| HpCDFs | 1.86 | | | |
| **Total PCDD/Fs** | **18.3** | | **21.5** | |
| **TEQ (ND=0)** | **0.200** | | **1.5** | **ITEF** |
| **TEQ (ND=DL/2)** | **1.38** | | **2.68** | **ITEF** |


ALTA ANALYTICAL PERSPECTIVES

2714 Exchange Drive
Wilmington
North Carolina 28405
USA

Tel: 910 794-1613
Fax: 910 794-3919
e-mail: ytondeur@cs.com
web: www.ultratrace.com


Reviewer Ce
Date 25 Feb Ø1

# Sample ID: M23-1

## Method M23

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | PES | Matrix: | Air | Project No.: | P1388 | Date Received: | 6-Feb-01 |
| Project ID: | F181.001 | Weight/Volume: | 1 | Sample ID: | P1388_275_001CU | Date Extracted: | 8-Feb-01 |
| Date Collected: | 31-Jan-01 | | | QC Batch No.: | 275 | Date Analyzed: | 23-FEB-01 |

| Analyte | Conc. pg | DL pg | EMPC pg | Qualifier | Recoveries IS | Recoveries SS | Recoveries AS |
|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.792 | | | 102 | 96.5 | 97.9 |
| 1,2,3,7,8-PeCDD | EMPC | | 1.74 | A | 99.7 | 93.1 | 97.9 |
| 1,2,3,4,7,8-HxCDD | 4.56 | | | A | 104 | 91.1 | 97.9 |
| 1,2,3,6,7,8-HxCDD | 7.58 | | | A | 104 | 91.1 | 97.9 |
| 1,2,3,7,8,9-HxCDD | 4.64 | | | A | 104 | 91.1 | 97.9 |
| 1,2,3,4,6,7,8-HpCDD | 27.3 | | | A B | 96.5 | 90.3 | 97.9 |
| OCDD | 74.4 | | | A B | 83.6 | 90.3 | 97.9 |
| 2,3,7,8-TCDF | 11.3 | | | | 100 | 96.5 | 97.9 |
| 1,2,3,7,8-PeCDF | 20.9 | | | A | 91.1 | 93.1 | 97.9 |
| 2,3,4,7,8-PeCDF | 46.6 | | | A | 91.1 | 93.1 | 97.9 |
| 1,2,3,4,7,8-HxCDF | 48.9 | | | A B | 90.7 | 96.9 | 97.9 |
| 1,2,3,6,7,8-HxCDF | 54.6 | | | | 90.7 | 96.9 | 97.9 |
| 2,3,4,6,7,8-HxCDF | 87.3 | | | | 90.7 | 96.9 | 97.9 |
| 1,2,3,7,8,9-HxCDF | 13.7 | | | A | 90.7 | 96.9 | 97.9 |
| 1,2,3,4,6,7,8-HpCDF | 234 | | | B | 86 | 90.3 | 97.9 |
| 1,2,3,4,7,8,9-HpCDF | 26.5 | | | A | 86 | 90.3 | 97.9 |
| OCDF | 145 | | | | 81.3 | 90.3 | 97.9 |

| Totals & TEQs | Conc. pg | DL pg | EMPC pg | Qualifier |
|---|---|---|---|---|
| TCDDs | 17.3 | | | |
| PeCDDs | 41.3 | | 48.5 | |
| HxCDDs | 68.2 | | | |
| HpCDDs | 55.6 | | | |
| TCDFs | 345 | | 370 | |
| PeCDFs | 451 | | 456 | |
| HxCDFs | 517 | | | |
| HpCDFs | 370 | | | |
| **Total PCDD/Fs** | **2090** | | **2120** | |
| **TEQ (ND=0)** | **50.7** | | **51.5** | **ITEF** |
| **TEQ (ND=DL/2)** | **51.1** | | **51.9** | **ITEF** |

ALTA ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington
North Carolina 28405
USA

Tel: 910 794-1613
Fax: 910 794-3919
e-mail: ytondeur@cs.com
web: www.ultratrace.com

Reviewer a
Date 25 Feb 01

# Sample ID: M23-2 — Method M23

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | PES | Matrix: | Air | Project No.: | P1388 | Date Received: | 6-Feb-01 |
| Project ID: | F181.001 | Weight/Volume: | 1 | Sample ID: | P1388_275_002 | Date Extracted: | 8-Feb-01 |
| Date Collected: | 31-Jan-01 | | | QC Batch No.: | 275 | Date Analyzed: | 14-FEB-01 |

| Analyte | Conc. pg | DL pg | EMPC pg | Qualifier | Recoveries IS | Recoveries SS | Recoveries AS |
|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | 0.945 | | | A B | 98 | 102 | 86.2 |
| 1,2,3,7,8-PeCDD | 2.44 | | | A | 108 | 105 | 86.2 |
| 1,2,3,4,7,8-HxCDD | EMPC | | 1.96 | A | 97.4 | 102 | 86.2 |
| 1,2,3,6,7,8-HxCDD | EMPC | | 5.04 | A | 97.4 | 102 | 86.2 |
| 1,2,3,7,8,9-HxCDD | 2.76 | | | A | 97.4 | 102 | 86.2 |
| 1,2,3,4,6,7,8-HpCDD | 21.5 | | | A B | 98.1 | 104 | 86.2 |
| OCDD | 57.1 | | | A B | 91.3 | 104 | 86.2 |
| 2,3,7,8-TCDF | 8.77 | | | A | 94 | 102 | 86.2 |
| 1,2,3,7,8-PeCDF | 15.2 | | | A | 95.4 | 105 | 86.2 |
| 2,3,4,7,8-PeCDF | 36.1 | | | A | 95.4 | 105 | 86.2 |
| 1,2,3,4,7,8-HxCDF | 40 | | | A B | 85.9 | 104 | 86.2 |
| 1,2,3,6,7,8-HxCDF | 45.7 | | | A | 85.9 | 104 | 86.2 |
| 2,3,4,6,7,8-HxCDF | 73.7 | | | | 85.9 | 104 | 86.2 |
| 1,2,3,7,8,9-HxCDF | 11.1 | | | A | 85.9 | 104 | 86.2 |
| 1,2,3,4,6,7,8-HpCDF | 208 | | | B | 85.4 | 104 | 86.2 |
| 1,2,3,4,7,8,9-HpCDF | 22.2 | | | A | 85.4 | 104 | 86.2 |
| OCDF | 118 | | | | 88.9 | 104 | 86.2 |
| **Totals & TEQs** | | | | | | | |
| TCDDs | 13 | | 15.6 | | | | |
| PeCDDs | 31.3 | | 33.9 | | | | |
| HxCDDs | 42.9 | | 49.9 | | | | |
| HpCDDs | 44.4 | | | | | | |
| TCDFs | 265 | | | | | | |
| PeCDFs | 354 | | 360 | | | | |
| HxCDFs | 441 | | | | | | |
| HpCDFs | 328 | | | | | | |
| **Total PCDD/Fs** | **1690** | | **1710** | | | | |
| **TEQ (ND=0)** | **41.9** | | **42.6** | ITEF | | | |
| **TEQ (ND=DL/2)** | **41.9** | | **42.6** | ITEF | | | |


ALTA ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington
North Carolina 28405
USA

Tel: 910 794-1613
Fax: 910 794-3919
e-mail: ytondeur@cs.com
web: www.ultratrace.com


Reviewer Ce
Date 25 Feb 01

# Sample ID: M23-3

# Method M23

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | PES | Matrix: | Air | Project No.: | P1388 | Date Received: | 6-Feb-01 |
| Project ID: | F181.001 | Weight/Volume: | 1 | Sample ID: | P1388_275_003 | Date Extracted: | 8-Feb-01 |
| Date Collected: | 1-Feb-01 | | | QC Batch No.: | 275 | Date Analyzed: | 14-FEB-01 |

| Analyte | Conc. | DL | EMPC | Qualifier | Recoveries | | |
|---|---|---|---|---|---|---|---|
| | pg | pg | pg | | IS | SS | AS |
| 2,3,7,8-TCDD | ND | 0.58 | | | 103 | 84 | 89.8 |
| 1,2,3,7,8-PeCDD | ND | 1.63 | | | 111 | 83.5 | 89.8 |
| 1,2,3,4,7,8-HxCDD | 2.54 | | | A | 102 | 84.1 | 89.8 |
| 1,2,3,6,7,8-HxCDD | 4.63 | | | A | 102 | 84.1 | 89.8 |
| 1,2,3,7,8,9-HxCDD | EMPC | | 2.25 | A | 102 | 84.1 | 89.8 |
| 1,2,3,4,6,7,8-HpCDD | 20.5 | | | A B | 103 | 85.7 | 89.8 |
| OCDD | 63.3 | | | A B | 94.1 | 85.7 | 89.8 |
| 2,3,7,8-TCDF | 7.39 | | | A | 98.5 | 84 | 89.8 |
| 1,2,3,7,8-PeCDF | 11.6 | | | A | 99.5 | 83.5 | 89.8 |
| 2,3,4,7,8-PeCDF | 26.5 | | | A | 99.5 | 83.5 | 89.8 |
| 1,2,3,4,7,8-HxCDF | 28.9 | | | A B | 90.2 | 82.3 | 89.8 |
| 1,2,3,6,7,8-HxCDF | 35.5 | | | A | 90.2 | 82.3 | 89.8 |
| 2,3,4,6,7,8-HxCDF | 60.2 | | | | 90.2 | 82.3 | 89.8 |
| 1,2,3,7,8,9-HxCDF | 8.99 | | | A | 90.2 | 82.3 | 89.8 |
| 1,2,3,4,6,7,8-HpCDF | 172 | | | B | 87.7 | 85.7 | 89.8 |
| 1,2,3,4,7,8,9-HpCDF | 18.8 | | | A | 87.7 | 85.7 | 89.8 |
| OCDF | 113 | | | | 90.4 | 85.7 | 89.8 |
| **Totals & TEQs** | | | | | | | |
| TCDDs | 3.93 | | 6.91 | | | | |
| PeCDDs | 18.8 | | | | | | |
| HxCDDs | 38.9 | | 43 | | | | |
| HpCDDs | 41.5 | | | | | | |
| TCDFs | 205 | | | | | | |
| PeCDFs | 277 | | | | | | |
| HxCDFs | 345 | | | | | | |
| HpCDFs | 274 | | | | | | |
| **Total PCDD/Fs** | **1380** | | **1390** | | | | |
| **TEQ (ND=0)** | **30.9** | | **31.1** | **ITEF** | | | |
| **TEQ (ND=DL/2)** | **31.6** | | **31.8** | **ITEF** | | | |

ALTA ANALYTICAL PERSPECTIVES

2714 Exchange Drive
Wilmington
North Carolina 28405
USA

Tel: 910 794-1613
Fax: 910 794-3919
e-mail: ytondeur@cs.com
web: www.ultratrace.com

Reviewer ....Cl....
Date ...25.Feb.01.

P.228

ALTA ANALYTICAL PERSPECTIVES

# PART 2

# SAMPLE PATH

DOCUMENTATION FOR THE ANALYSIS
OF
POLYCHLORINATED DIBENZO-P-DIOXINS & DIBENZOFURANS

ALTA ANALYTICAL PERSPECTIVES

# SAMPLE PATH

**AAP PROJECT NO.: P1388**
**PROTOCOL: 23**

## SAMPLE PROCESSING

Extraction
- ☑ SDS
- ☑ Extraction Standards ($^{13}C_{12}$ - PCDD / F) "IS" & "SS"

Fractionation 50 %
- ☑ Alternate Standards "AS"
- ☑ Multi-Column Cleanup (ASECS)
- ☑ Final Extract

Analysis
- ☑ Injection Standards "RS"
- ☑ HRGC / HRMS
- ☑ 12-H Performance Checks

Interpretation
- ☑ ID Criteria
- ☑ Detection Limits
- ☑ Recoveries

## SPIKE PROFILE

| | |
|---|---|
| NS: | 100 PG (10 μL; 0.01 NG/μL) FOR OPR ONLY |
| IS: | 4 NG (25 μL; 0.16 NG/μL) |
| AS & SS: | 4 NG (25 μL; 0.16 NG/μL) |
| RS: | 2 NG (10 μL; 0.2 NG/μL) |

## SOPs

| | |
|---|---|
| EXTRACTION: | AP-SP-E |
| FRACTIONATION: | AP-SP-CU |
| ANALYSIS: | AP-SP-A |
| CONCENTRATION: | AP-SP-N |
| FORTIFICATION: | AP-SP-F |
| DATA VALIDATION: | AP-SP-R |

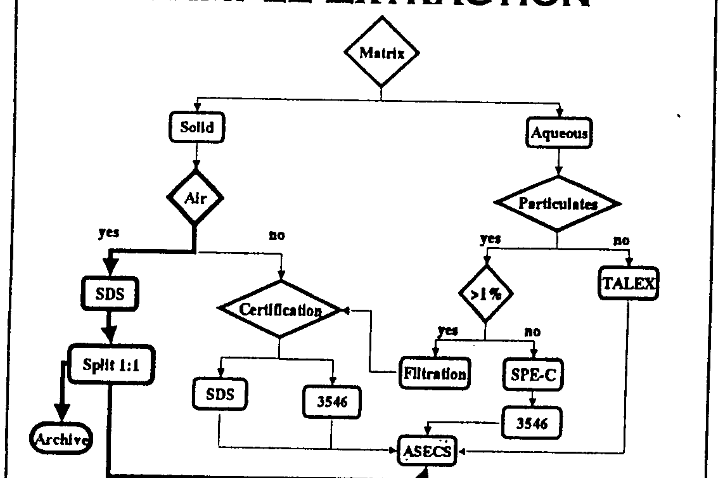
## QC PROFILE

| | |
|---|---|
| LMB: | ALWAYS REQUIRED |
| OPR: | ALWAYS REQUIRED |

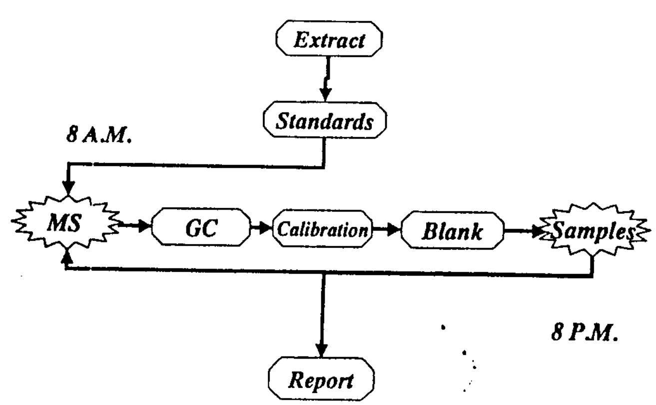
**REPORTING PLATFORM**

LEVEL: I II III PLATINUM

## SAMPLE EXTRACTION




## SAMPLE ANALYSIS




**SPECIAL REQUIREMENTS**

—

—

**SUPPLIES IDs**

| | |
|---|---|
| SAND | — |
| TOLUENE | 05499 |
| ACID SILICA | 01152001A |
| BASE SILICA | 02062001A |
| SILICA | 01182001 |
| FLORISIL | SP02058 |
| HEXANE | 007436 |
| $CH_2Cl_2$ | 003597 |
| TETRADECANE | 138078 |

ALTA ANALYTICAL PERSPECTIVES

**Project:** P1388

# Extraction Set: 275

**Chemist:** CMR 02/08/01

**Method(s):** EPA Method 23

**Vial Box ID:** —

| ALTA Sample ID | Client Sample ID | PUF/Trap Prep Date | XAD Lot# | IS/NS CHEM/ WIT DATE (CMR 02/08/01; 25µl IS, 10µl NS) | Impinger Extraction Date | AS CHEM/WIT DATE (CMR 02/09/01; 25µl) | SiGEL/MSF CHEM/Date N/A (Circle One) ($C_{14}$ – 10µl, YT 12Feb01) | ASECS CC CHEM/Date | RS CHEM/WIT DATE (YT 13Feb01; 10µl) |
|---|---|---|---|---|---|---|---|---|---|
| 0_275_MB001 | — | — | — | BT 02-08-01 | — | BT 02-09-01 | GO | GO | GO |
| 0_275_OPR001 | — | — | — | BT * BT 02-08-01 | — | BT | GO 12FEB01 | GO 12FEB01 | GO 13Feb01 |
| P1388_275_001 | M23-1 | — | — | BT | — | BT | GO | GO | GO (*XX) |
| P1388_275_002 | M23-2 | — | — | BT | — | BT | GO | GO | GO |
| P1388_275_003 | M23-3 | — | — | BT | — | BT | GO | GO | GO |

001 1 filter - dry, white, grey & yellow XAD - sticky, no coloration g/w blackish grey, white, wet smokey odor

002 1 filter - dry, grey XAD - trap arrived broken on front end XAD sticky no coloration g/w wet, white

003 1 filter - dry, grey yellow XAD - sticky, no coloration g/w wet, white

02/22/01 Took Archived vial* CMR and put it in a mini vial w/. N2'd to 8µl. Added 9µl RS for final vol of 16µl. Labeled vial as such and sent to MSpec.

P1370
PACIFIC ENVIROMENTAL SERVIC[ES] ALTA ANALYTICAL PERSPECTIVES
PREP.: 01 JAN 25
EXPIRATION: 02 FEB 08
4 NG SAMPLING STANDARDS PCDD/FS
INITIALS: JCF

11Feb01

001: final extract is yellow. Y.T.

→ Diluted final extract before GC/MS.

(*XX) { 2µL of 10µL final volume
+ 2µL of RS (0.2 ng/µL)
+ 16µL of $C_{14}$ (-2)

* note: original vial contains 10µL $C_{14}$ - No RS added to it → cap, store/save. Y.T.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| IS ID #1: 000919C 428-IS exp 09/19/02 | NS ID #1: 000919D 428-NS exp 09/19/02 | AS ID #1: 000919B 428-AS exp 09/19/02 | RS ID #1: 000919E 428-RS exp. 09/19/02 | Cycle #1: 02/08/01 Start 5:30pm | #2: — | Split / / | Check Out: Chemist: CMR 02/08/01 — / / |
| IS ID #2: — | NS ID #2: — | AS ID #2: — | RS ID #2: * VH | 02/09/01 Stop: 11:30Am | — | 1:4 1:2 | Check-In: Chemist: — / / — / / |
| IS ID #3: — | NS ID #3: — | AS ID #3: — | RS ID #3: — | | | | |
| IS ID #4: — | NS ID #4: — | AS ID #4: — | RS ID #4: — | | | | |

Alta Analytical Perspectives

# SAMPLE PATH

AAP PROJECT NO.: P1388
PROTOCOL: 23

## COMMUNICATIONS

ce 25Feb01

ALTA ANALYTICAL PERSPECTIVES

## *Sample Inventory Report: MM5 Sampling Train*

**Project No.:** P1388 **Project Name:** General Analytical HRMS

**Date Rec.:** 6-Feb-01

| Lab. Sample ID | Collection Date | Client Sample ID | Component ID |
|---|---|---|---|
| 001 | 31-Jan-01 | M23-1 | Ace/Me |
| | 31-Jan-01 | | Filter |
| | 31-Jan-01 | | XAD |
| 002 | 31-Jan-01 | M23-2 | Ace/Me |
| | 31-Jan-01 | | Filter |
| | 31-Jan-01 | | XAD |
| 003 | 1-Feb-01 | M23-3 | Ace/Me |
| | 1-Feb-01 | | Filter |
| | 1-Feb-01 | | XAD |
| 004 | 1-Feb-01 | Reagent Blk | Ace/Me |
| | 1-Feb-01 | Hold | Toluene |
| | 1-Feb-01 | | XAD |

CM
06 Feb 01

# PROCESS SHEET

**Project No.-AR:** P1388-1 of 1
**Client:** Pacific Environmental Services (PAENC01A)
**Client Manager:** Yves Tondeur

**Project Due:** 2/27/01
**TAT:** 21
**Extraction Due:** 3/2/01

**Method:** EPA Method 23
**Extraction Type:** EPA Method 23

**Matrix:** MM5
**Split Type:** 1:2

**Component:** PCDD/F (Tetra - Octa)

| LabID | Client-ID | Component Type | Client Component ID | Date Received | SLoc |
|---|---|---|---|---|---|
| 001 | M23-1 | Filter#1 | Filter | 2/6/01 | F-2 |
| | | Solvent#1 | Ace/Me | 2/6/01 | F-2 |
| | | XAD#1 | XAD | 2/6/01 | F-2 |
| 002 | M23-2 | Filter#1 | Filter | 2/6/01 | F-2 |
| | | Solvent#1 | Ace/Me | 2/6/01 | F-2 |
| | | XAD#1 | XAD | 2/6/01 | F-2 |
| 003 | M23-3 | Filter#1 | Filter | 2/6/01 | F-2 |
| | | Solvent#1 | Ace/Me | 2/6/01 | F-2 |
| | | XAD#1 | XAD | 2/6/01 | F-2 |

**Instructions:**

**Report Options**

Report Level: 1

EDD Type:

**Vial Box ID:** ____________

Date Requested: 2/20/01

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

# Chain of Custody Record

Project Numb: F181.001
Project Name: Andrews AFB Medical Waste Incinerator
Samplers: DD Holzschuh, J Falank, MD Maret

| Date | Time | Field Sample ID | Sample Description | PCDD | PCDF | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/31/01 | 1000 | M23-1-1 ✓ | Filter, dry | • | • | | | | | | |
| 1/31/01 | 1000 | M23-1-2 ✓ | XAD Sorbent Module | • | • | | | | | | |
| 1/31/01 | 1000 | M23-1-3 ✓ | Front Half Back Half Acetone/Toluene rince | • | • | | | | | | |
| 1/31/01 | 1000 | M23-1-4A ✓ | Impinger Contents Fraction 1 | • | • | | | | | | |
| 1/31/01 | 1000 | M23-1-4B ✓ | Impinger Contents Fraction 2 | • | • | | | | | | |
| 1/31/01 | 1500 | M23-2-1 ✓ | Filter, dry | • | • | | | | | | |
| 1/31/01 | 1500 | M23-2-2 ✓ | XAD Sorbent Module | • | • | | | | | | |
| 1/31/01 | 1500 | M23-2-3 ✓ | Front Half Back Half Acetone/Toluene rince | • | • | | | | | | |
| 1/31/01 | 1500 | M23-2-4A ✓ | Impinger Contents Fraction 1 | • | • | | | | | | |
| 1/31/01 | 1500 | M23-2-4A ✓ | Impinger Contents Fraction 2 | • | • | | | | | | |
| 2/1/01 | 0900 | M23-3-1 ✓ | Filter, dry | • | • | | | | | | |
| 2/1/01 | 0900 | M23-3-2 ✓ | XAD Sorbent Module | • | • | | | | | | |
| 2/1/01 | 0900 | M23-3-3 ✓ | Front Half Back Half Acetone/Toluene rince | • | • | | | | | | |
| 2/1/01 | 0900 | M23-3-3A * | Front Half Back Half Acetone/Toluene rince | • | • | | | | | | * → ~~missing~~ not labeled completely: M23-3 FH/BH 2nd Fract. |
| 2/1/01 | 0900 | M23-3-4A – | Impinger Contents Fraction 1 | • | • | | | | | | |
| 2/1/01 | 0900 | M23-3-4B – | Impinger Contents Fraction 2 | • | • | | | | | | |
| 2/1/01 | 1400 | M23-B-2 | XAD Sorbent Module | • | • | | | | | | Archive |
| 2/1/01 | 1400 | M23-DI ✓ | HPLC Water Reagent | • | • | | | | | | Archive |
| 2/1/01 | 1400 | M23-A | Acetone Reagent Blank | • | • | | | | | | Archive |
| 2/1/01 | 1400 | M23-T ✓ | Toluene Reagent Blank | • | • | | | | | | Archive |

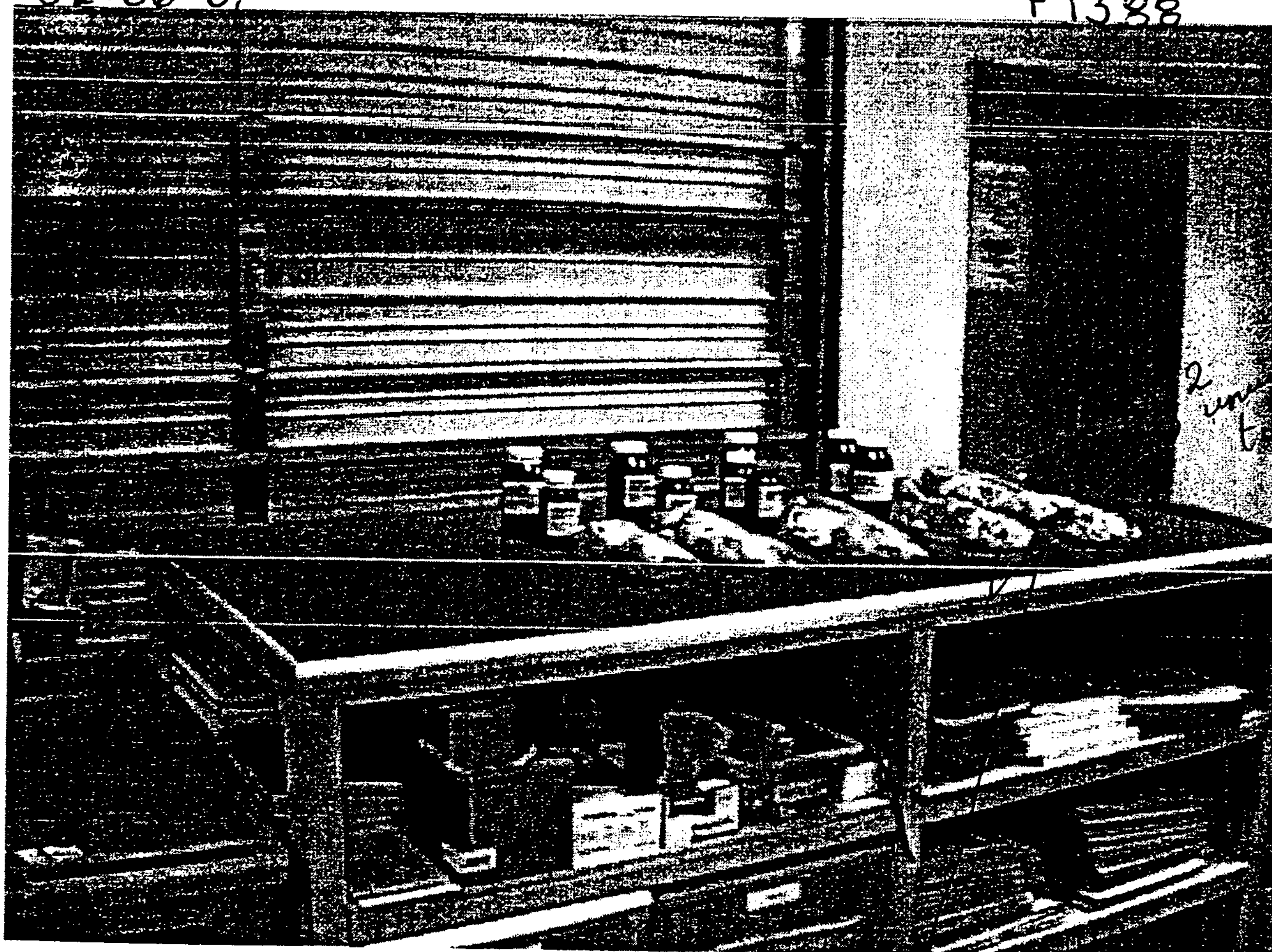
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Relinquished by: (Signature) | Date/Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 2/6/01 10:20 | [signature] | | | |

| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Relinquished by: (Signature) | Date/Time | Received by: (Signature) |
|---|---|---|---|---|---|
| | 2-6-01 1:25 | [signature] | | | |

| Relinquished by: (Signature) | Date/Time | Received for lab by: (Signature) | REMARKS |
|---|---|---|---|
| [signature] | 2/2/01 | | |

02-06-01

P 1388



2 unused traps

Note: Imp. catch (2 bottles) sple) not shown.

TT
06Feb01.

Blank (Hold)

STANDARD OPERATING PROCEDURE

ALTA ANALYTICAL PERSPECTIVES

Attachment 1

ALTA ANALYTICAL PERSPECTIVES Project No.: P 1388

| Sample Log-In Checklist | Yes | No |
|---|---|---|
| 1. Date Samples Arrived: 02-06-01 Initials: BG | | |
| 2. Time / Date logged in: 1:28 02-06-01 Location F-2 Initials: BG | | |
| 3. Samples Arrived By: (circle one) Airborne Express Federal Express UPS Emery Freezer Truck Company Courier DHL Other | | |
| 4. Shipping Preservation: (circle) Ice / Blue Ice / Dry Ice None Temp °C 19° | | |
| 5. Shipping Documentation Present? (circle one) Shipping Label Airbill Tracking Number | | ✓ |
| 6. Shipping Container(s) Intact? If no, describe condition below. | ✓ | |
| 7. Container Custody Seals Present and Intact? If not intact, describe condition below. | | ✓ |
| 8. Sample Custody Seals Present and Intact? If not intact, describe condition below. No. of Seals ______ or Seal No. | | ✓ |
| 9. Sample Container Intact? If no, indicate sample condition below. | ✓ | |
| 10. Chain of Custody (COC) or other Sample Documentation Present? | ✓ | |
| 11. COC/Documentation Acceptable? If no, complete COC Anomaly Form. | ✓ | |
| 12. Shipping Container: (circle) ALTA ANALYTICAL PERSPECTIVES Return or Retain or Dispose; Client Return or Retain or Dispose | | |
| 13. Container and/or Bottles Requested? | | ✓ |
| 14. Sample Control Check In/Out Log Completed? | ✓ | |
| 15. Drinking Water Sample? If yes, Acceptable Preservation? (circle) Y or N | | ✓ |
| 16. Imported Soil? If yes, apply appropriate label. | | ✓ |

Name: [signature] Date Samples Reconciled: ______

Comments:

Alta Analytical Perspectives - Injection Log Run file: 010214P1 GC Column ID: db-5 

| Data file | S# | Vial# | Lab ID | Sample ID (Chrom. Text) | Analyst | Acq date | Acq time |
|---|---|---|---|---|---|---|---|
| 010214P1 | 1 | 3 | CS3RC | DB5 CPSM / M23 CS3 | GAG | 14-FEB-01 | 11:05:47 V |
| 010214P1 | 2 | 76 | 0_275_OPR001 | 0_275_OPR001 | GAG | 14-FEB-01 | 11:57:29 |
| 010214P1 | 3 | 77 | 0_275_MB001 | 0_275_MB001 | GAG | 14-FEB-01 | 12:49:16 |
| 010214P1 | 4 | 78 | P1388_275_001D10 | P1388_275_001 M23-1 Air Train D10 not processed 2a st. run | GAG | 14-FEB-01 | 13:41:03 |
| 010214P1 | 5 | 79 | P1388_275_002 | P1388_275_002 M23-2 Air Train | GAG | 14-FEB-01 | 14:32:45 |
| 010214P1 | 6 | 80 | P1388_275_003 | P1388_275_003 M23-3 Air Train | GAG | 14-FEB-01 | 15:24:32 |
| 010214P1 | 7 | 3 | CS3RC | DB5 CPSM / M23 CS3 | GAG | 14-FEB-01 | 16:16:11 V |
| 010223P1 | 1 | 3 | CS3RC | DB5 CPSM / M23 CS3 | GAG | 23-FEB-01 | 11:17:52 V |
| 010223P1 | 2 | 15 | SB | SOLVENT BLANK | GAG | 23-FEB-01 | 12:09:30 |
| 010223P1 | 3 | 65 | P1388_275_001CU | P1388_275_001 M23-1 Air Train CU | GAG | 23-FEB-01 | 13:01:16 |
| 010223P1 | 4 | 3 | CS3RC | DB5 CPSM / M23 CS3 | GAG | 23-FEB-01 | 13:52:50 V |

resolution plot for function 5 of ending CS3 on 14 Feb01 not printed (SIOS communication lost while centroiding function 5 - system had to be rebooted)
OK Y.T.

?13..

ALTA ANALYTICAL PERSPECTIVES

# PART 3

# ANALYTICAL RESULTS

DOCUMENTATION FOR THE ANALYSIS
OF
POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS

# Sample ID: 0_275_MB001

## Method M23

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | PES | Matrix: | Air | Project No.: | P1388 | Date Received: | n/a |
| Project ID: | F181.001 | Weight/Volume: | 1 | Sample ID: | 0_275_MB001 | Date Extracted: | 8-Feb-01 |
| Date Collected: | n/a | | | QC Batch No.: | 275 | Date Analyzed: | 14-FEB-01 |

| Analyte | Conc. pg | DL pg | EMPC pg | Qualifier | Recoveries IS | Recoveries SS | Recoveries AS |
|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | EMPC | | 1.29 | A | 99.6 | 98.2 | 85.4 |
| 1,2,3,7,8-PeCDD | ND | 0.997 | | | 100 | 96.4 | 85.4 |
| 1,2,3,4,7,8-HxCDD | ND | 1.68 | | | 100 | 97.1 | 85.4 |
| 1,2,3,6,7,8-HxCDD | ND | 1.87 | | | 100 | 97.1 | 85.4 |
| 1,2,3,7,8,9-HxCDD | ND | 1.68 | | | 100 | 97.1 | 85.4 |
| 1,2,3,4,6,7,8-HpCDD | EMPC | | 1.9 | A | 100 | 99.1 | 85.4 |
| OCDD | 12.9 | | | A | 95.7 | 99.1 | 85.4 |
| 2,3,7,8-TCDF | ND | 1.27 | | | 100 | 98.2 | 85.4 |
| 1,2,3,7,8-PeCDF | ND | 1.84 | | | 93.6 | 96.4 | 85.4 |
| 2,3,4,7,8-PeCDF | ND | 1.81 | | | 93.6 | 96.4 | 85.4 |
| 1,2,3,4,7,8-HxCDF | 1.69 | | | A | 86.5 | 97.3 | 85.4 |
| 1,2,3,6,7,8-HxCDF | ND | 0.552 | | | 86.5 | 97.3 | 85.4 |
| 2,3,4,6,7,8-HxCDF | ND | 0.586 | | | 86.5 | 97.3 | 85.4 |
| 1,2,3,7,8,9-HxCDF | ND | 0.67 | | | 86.5 | 97.3 | 85.4 |
| 1,2,3,4,6,7,8-HpCDF | 1.86 | | | A | 88 | 99.1 | 85.4 |
| 1,2,3,4,7,8,9-HpCDF | ND | 2.03 | | | 88 | 99.1 | 85.4 |
| OCDF | ND | 2.83 | | | 91 | 99.1 | 85.4 |

| Totals & TEQs | Conc. pg | DL pg | EMPC pg | Qualifier |
|---|---|---|---|---|
| TCDDs | ND | | 1.29 | |
| PeCDDs | ND | 0.997 | | |
| HxCDDs | ND | 1.74 | | |
| HpCDDs | 1.83 | | 3.73 | |
| TCDFs | ND | 1.27 | | |
| PeCDFs | ND | 1.83 | | |
| HxCDFs | 1.69 | | | |
| HpCDFs | 1.86 | | | |
| **Total PCDD/Fs** | **18.3** | | **21.5** | |
| **TEQ (ND=0)** | **0.200** | | **1.5** | **ITEF** |
| **TEQ (ND=DL/2)** | **1.38** | | **2.68** | **ITEF** |

ALTA ANALYTICAL PERSPECTIVES

2714 Exchange Drive
Wilmington
North Carolina 28405
USA

Tel: 910 794-1613
Fax: 910 794-3919
e-mail: ytondeur@cs.com
web: www.ultratrace.com

Reviewer Cl
Date 25 Feb 01

Client ID: 0_275_MB001 Filename: 010214P1 S: 3 Acq: 14-FEB-01 12:49:16 ConCal: 010214P1- 
Lab ID: 0_275_MB001 GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000 EndCal: 010214P1-

| | Name | Resp | RA | RRF | RT | Conc | Qualif. | CDE | noise | Fac | DL | EMPC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2,3,7,8-TCDD | 2.88e+04 | 0.39 n | 1.26 | 27:45 | 1.29 | | | 837 | 2.5 | 0.685 | |
| | 1,2,3,7,8-PeCDD | * | * n | 1.01 | NotF, | * | | | 596 | 2.5 | 0.997 | |
| | 1,2,3,4,7,8-HxCDD | * | * n | 1.14 | NotF, | * | | | 1072 | 2.5 | 1.68 | |
| | 1,2,3,6,7,8-HxCDD | * | * n | 1.02 | NotF, | * | | | 1072 | 2.5 | 1.87 | |
| | 1,2,3,7,8,9-HxCDD | * | * n | 1.14 | NotF, | * | | | 1072 | 2.5 | 1.68 | |
| | 1,2,3,4,6,7,8-HpCDD | 2.58e+04 | 1.46 n | 1.13 | 41:31 | 1.90 | | | 748 | 2.5 | 1.58 | |
| | OCDD | 1.23e+05 | 0.88 y | 1.03 | 46:51 | 12.9 | | | 700 | 2.5 | 2.49 | |
| | 2,3,7,8-TCDF | * | * n | 1.05 | NotF, | * | | | 1614 | 2.5 | 1.27 | |
| | 1,2,3,7,8-PeCDF | * | * n | 1.04 | NotF, | * | | | 1607 | 2.5 | 1.84 | |
| | 2,3,4,7,8-PeCDF | * | * n | 1.05 | NotF, | * | | | 1607 | 2.5 | 1.81 | |
| | 1,2,3,4,7,8-HxCDF | 2.81e+04 | 1.13 y | 1.13 | 36:08 | 1.69 | | | 788 | 2.5 | 0.603 | |
| | 1,2,3,6,7,8-HxCDF | * | * n | 1.24 | NotF, | * | | | 788 | 2.5 | 0.552 | |
| | 2,3,4,6,7,8-HxCDF | * | * n | 1.16 | NotF, | * | | | 788 | 2.5 | 0.586 | |
| | 1,2,3,7,8,9-HxCDF | * | * n | 1.02 | NotF, | * | | | 788 | 2.5 | 0.670 | |
| | 1,2,3,4,6,7,8-HpCDF | 3.02e+04 | 1.05 y | 1.54 | 39:53 | 1.86 | | | 1564 | 2.5 | 1.71 | |
| | 1,2,3,4,7,8,9-HpCDF | * | * n | 1.30 | NotF, | * | | | 1564 | 2.5 | 2.03 | |
| | OCDF | * | * n | 1.15 | NotF, | * | | | 962 | 2.5 | 2.83 | |
| | Total Tetra-Dioxins | * | * n | 1.26 | NotF, | * | | | 837 | 2.5 | 0.685 | 1.29 |
| | Total Penta-Dioxins | * | * n | 1.01 | NotF, | * | | | 596 | 2.5 | 0.997 | * |
| | Total Hexa-Dioxins | * | * n | 1.10 | NotF, | * | | | 1072 | 2.5 | 1.74 | * |
| | Total Hepta-Dioxins | 2.49e+04 | 1.04 y | 1.13 | 40:19 | 1.83 | | | 748 | 2.5 | 1.58 | 3.73 |
| | Total Tetra-Furans | * | * n | 1.05 | NotF, | * | | | 1614 | 2.5 | 1.27 | * |
| | 1st Fnc. Penta-Furans | * | * n | 1.05 | NotF, | * | | | 1804 | 2.5 | 2.05 | * |
| | Total Penta-Furans | * | * n | 1.05 | NotF, | * | | | 1607 | 2.5 | 1.83 | |
| | PeCDF Totals: | | | | | 0.00 | | | | | | 0.00 |
| | Total Hexa-Furans | 2.81e+04 | 1.13 y | 1.14 | 36:08 | 1.69 | | | 788 | 2.5 | 0.600 | 1.69 |
| | Total Hepta-Furans | 3.02e+04 | 1.05 y | 1.42 | 39:53 | 1.86 | | | 1564 | 2.5 | 1.86 | 1.86 |
| | | | | | | | | | | | | Rec |
| IS | 13C-2,3,7,8-TCDD | 7.11e+07 | 0.79 y | 1.13 | 27:43 | 3980 | | | | | | 99.6 |
| IS | 13C-1,2,3,7,8-PeCDD | 5.84e+07 | 1.58 y | 0.93 | 33:11 | 4010 | | | | | | 100 |
| IS | 13C-1,2,3,6,7,8-HxCDD | 4.96e+07 | 1.25 y | 0.93 | 37:12 | 4000 | | | | | | 100 |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.82e+07 | 1.04 y | 0.91 | 41:30 | 4010 | | | | | | 100 |
| IS | 13C-OCDD | 3.73e+07 | 0.90 y | 0.73 | 46:50 | 3830 | | | | | | 95.7 |
| IS | 13C-2,3,7,8-TCDF | 8.92e+07 | 0.77 y | 1.06 | 26:50 | 4000 | | | | | | 100 |
| IS | 13C-1,2,3,7,8-PeCDF | 7.53e+07 | 1.54 y | 0.96 | 31:42 | 3740 | | | | | | 93.6 |
| IS | 13C-1,2,3,6,7,8-HxCDF | 5.89e+07 | 0.52 y | 1.28 | 36:15 | 3460 | | | | | | 86.5 |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 4.22e+07 | 0.44 y | 0.90 | 39:52 | 3520 | | | | | | 88.0 |
| IS | 13C-OCDF | 3.92e+07 | 0.89 y | 0.81 | 47:09 | 3640 | | | | | | 91.0 |
| RS/RT | 13C-1,2,3,4-TCDD | 6.29e+07 | 0.79 y | 1.00 | 27:04 | 4000 | | | | | | - |
| RS | 13C-1,2,3,4-TCDF | 8.40e+07 | 0.77 y | 1.00 | 25:28 | 4000 | | | | | | - |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD | 5.31e+07 | 1.26 y | 1.00 | 37:31 | 4000 | | | | | | - |
| PS | 37Cl-2,3,7,8-TCDD | 3.59e+07 | | 0.51 | 27:45 | 3930 | | | | | | 98.2 |
| PS | 13C-2,3,4,7,8-PeCDF | 7.06e+07 | 1.55 y | 0.97 | 32:50 | 3850 | | | | | | 96.4 |
| PS | 13C-1,2,3,4,7,8-HxCDD | 4.44e+07 | 1.26 y | 0.92 | 37:05 | 3890 | | | | | | 97.1 |
| PS | 13C-1,2,3,4,7,8-HxCDF | 5.21e+07 | 0.52 y | 0.91 | 36:06 | 3890 | | | | | | 97.3 |
| PS | 13C-1,2,3,4,7,8,9-HpCDF | 3.57e+07 | 0.43 y | 0.85 | 42:19 | 3970 | | | | | | 99.1 |
| AS | 13C-1,2,3,7,8,9-HxCDF | 4.85e+07 | 0.52 y | 1.07 | 37:55 | 3420 | | | | | | 85.4 |

Reviewer: Ce

Date: 24 Feb 01

Analyst: GAG

Date: 23 Feb01

Totals class: TCDD EMPC Function: 1 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 1.2852 Unnamed Conc.: *

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27:45 | 1.254e+04 | y | 3.230e+04 | n | 0.39 | n | 4.484e+04 | 2.882e+04 | 1.07e+01 | y | 1.29 | 2,3,7,8-TCDD |



Totals class: PeCDD EMPC Function: 2 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NotF: | * | n | * | n | * | n | * | * | * | n | * | |



Totals class: HxCDD EMPC Function: 3 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NotF: | * | n | * | n | * | n | * | * | * | n | * | |



Totals class: HpCDD EMPC Function: 4 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 3.7295 Unnamed Conc.: 1.832

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40:19 | 1.273e+04 | y | 1.221e+04 | y | 1.04 | y | 2.494e+04 | 2.494e+04 | 2.95e+00 | y | 1.83 | |
| 41:31 | 1.854e+04 | y | 1.266e+04 | y | 1.46 | n | 3.120e+04 | 2.583e+04 | 2.38e+00 | n | 1.90 | 1,2,3,4,6,7,8-HpCDD |



Totals class: TCDF EMPC Function: 1 Run #: 10

File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NotF. | * | n | * | n | * | n | * | * | * | n | * | |

Page 12 of 18

Totals class: 1st Fnc.PeCDF EMPC Function: 1 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NotF. | * | n | * | n | * | n | * | * | * | n | * | |

Page 14 of 18

Totals class: PeCDF EMPC Function: 2 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NotF. | * | n | * | n | * | n | * | * | * | n | * | 1,2,3,7,8-PeCDF |

Page 16 of 18

Totals class: HxCDF EMPC Function: 3 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 1.6885 Unnamed Conc.: *

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36:08 | 1.490e+04 | y | 1.322e+04 | y | 1.13 | y | 2.813e+04 | 2.813e+04 | 5.10e+00 | y | 1.69 | 1,2,3,4,7,8-HxCDF |

Page 18 of 18

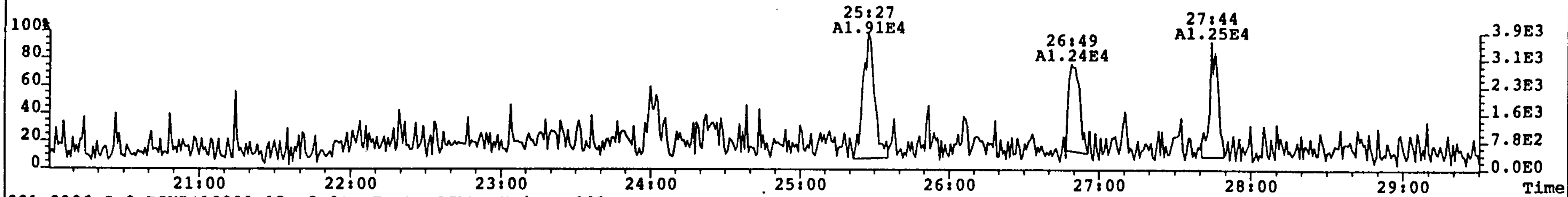
Totals class: HpCDF EMPC Function: 4 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

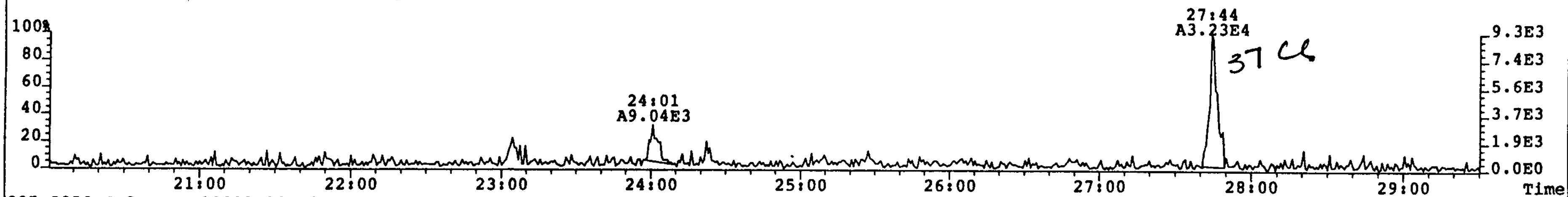
Total Conc.: 1.8583 Unnamed Conc.: *

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39:53 | 1.546e+04 | y | 1.477e+04 | y | 1.05 | y | 3.023e+04 | 3.023e+04 | 2.35e+00 | n | 1.86 | 1,2,3,4,6,7,8-HpCDF |

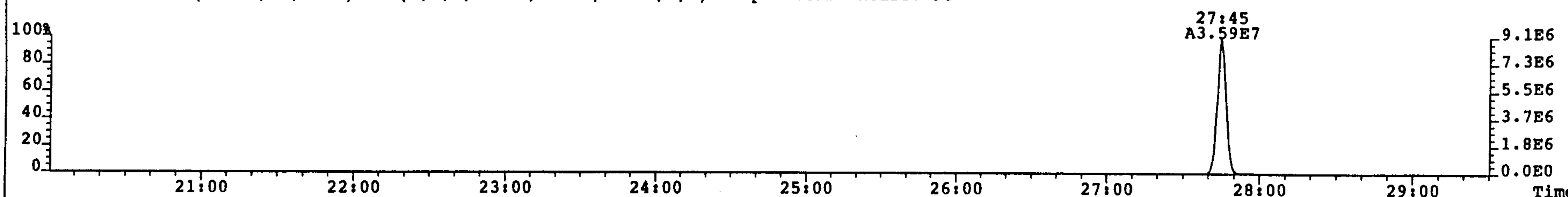
File: 010214P1  Acq: 14-FEB-2001 12:49:16  GC EI+ Voltage SIR  Autospec-UltimaE
Sample# 3  Text: 0_275_MB001  Vial# 77  File Text: AAP DB5
319.8965 S:3 BSUB(10000,15,-3.0)  Expt: OCDD  Noise: 192



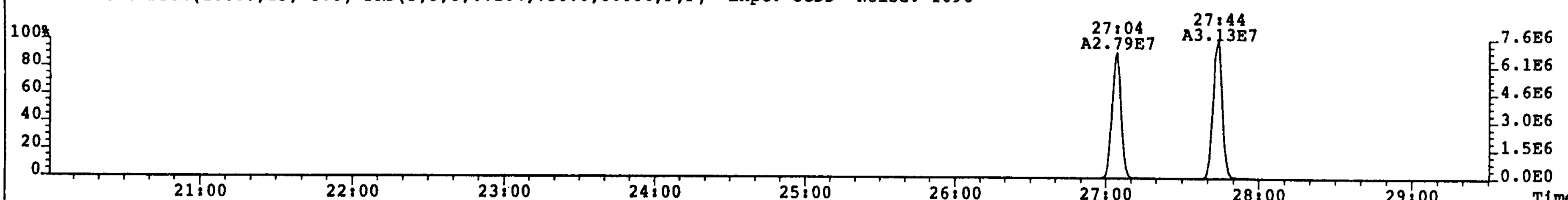

321.8936 S:3 BSUB(10000,15,-3.0)  Expt: OCDD  Noise: 103



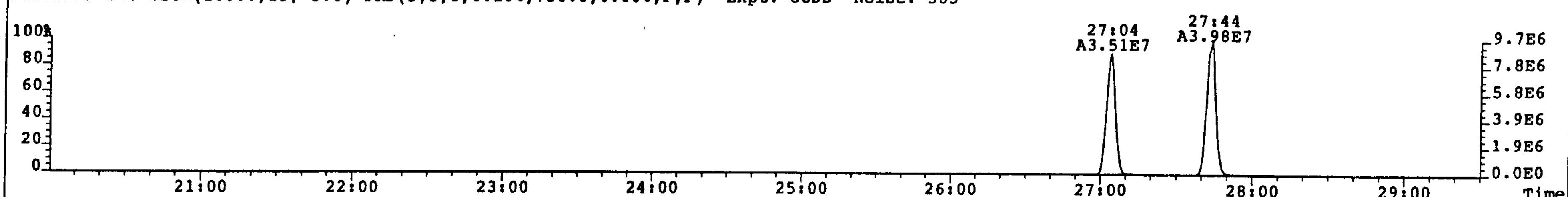

327.8850 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 96




331.9368 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 1096




333.9339 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 585



File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5

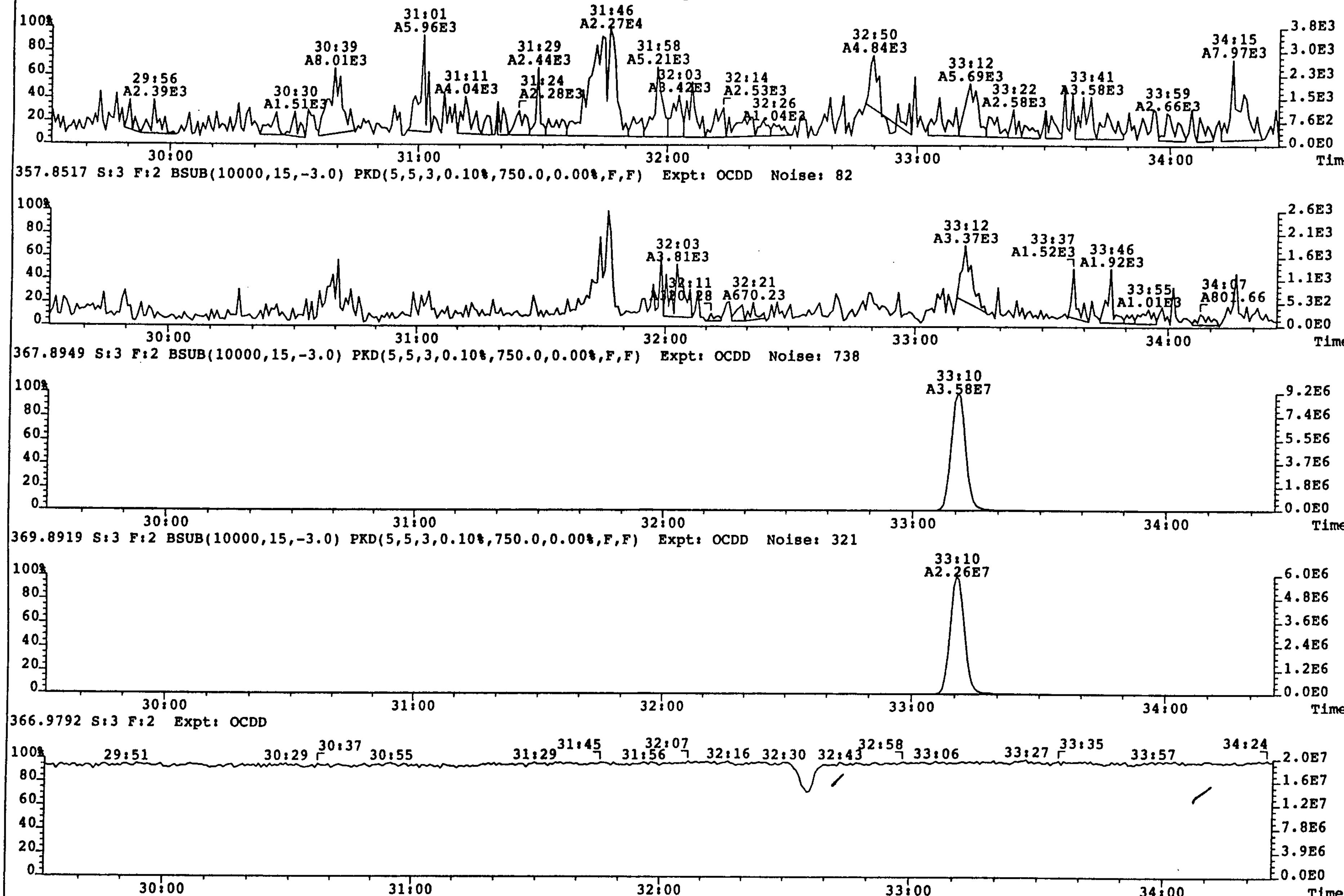
355.8546 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 199

357.8517 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 82

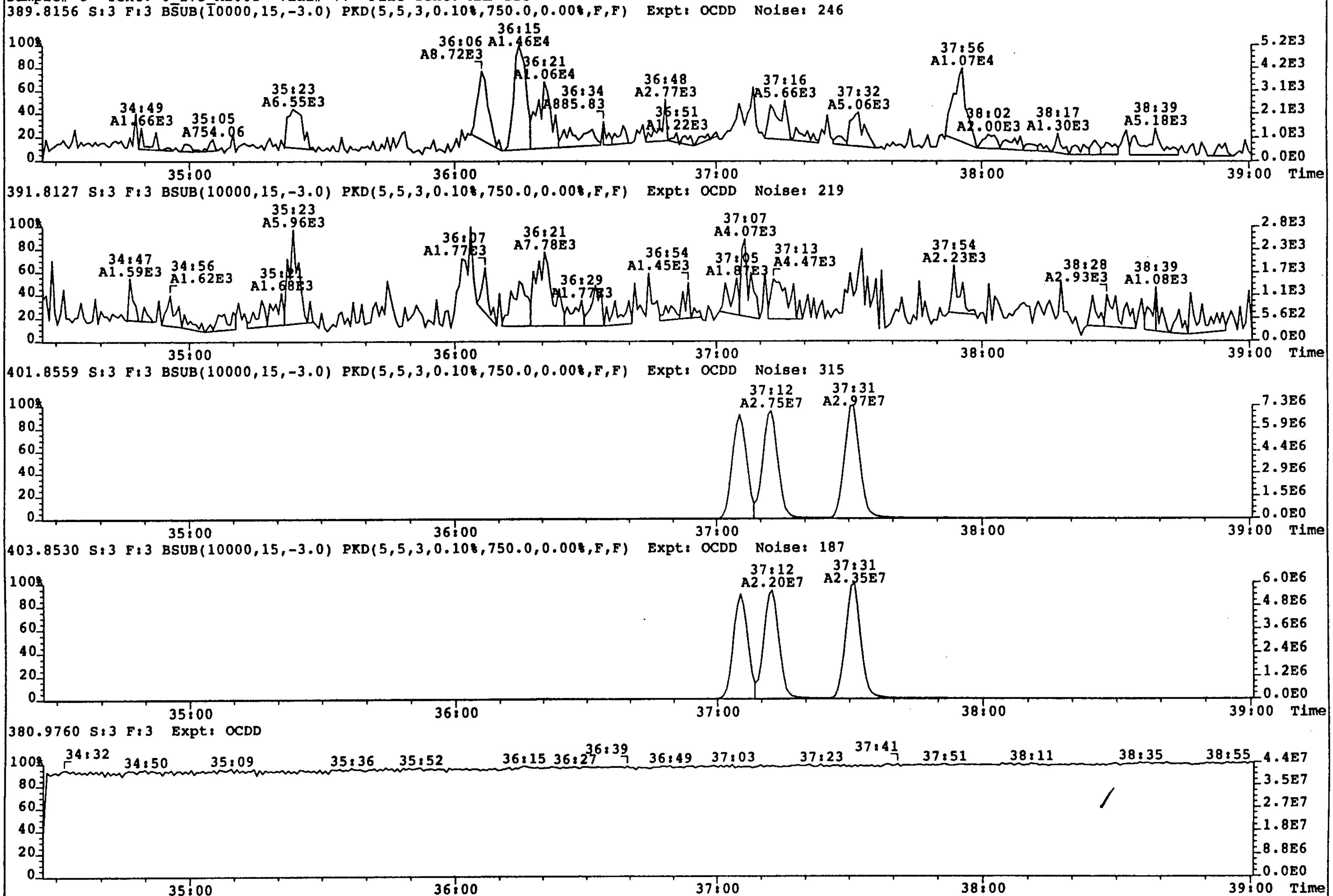
367.8949 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 738

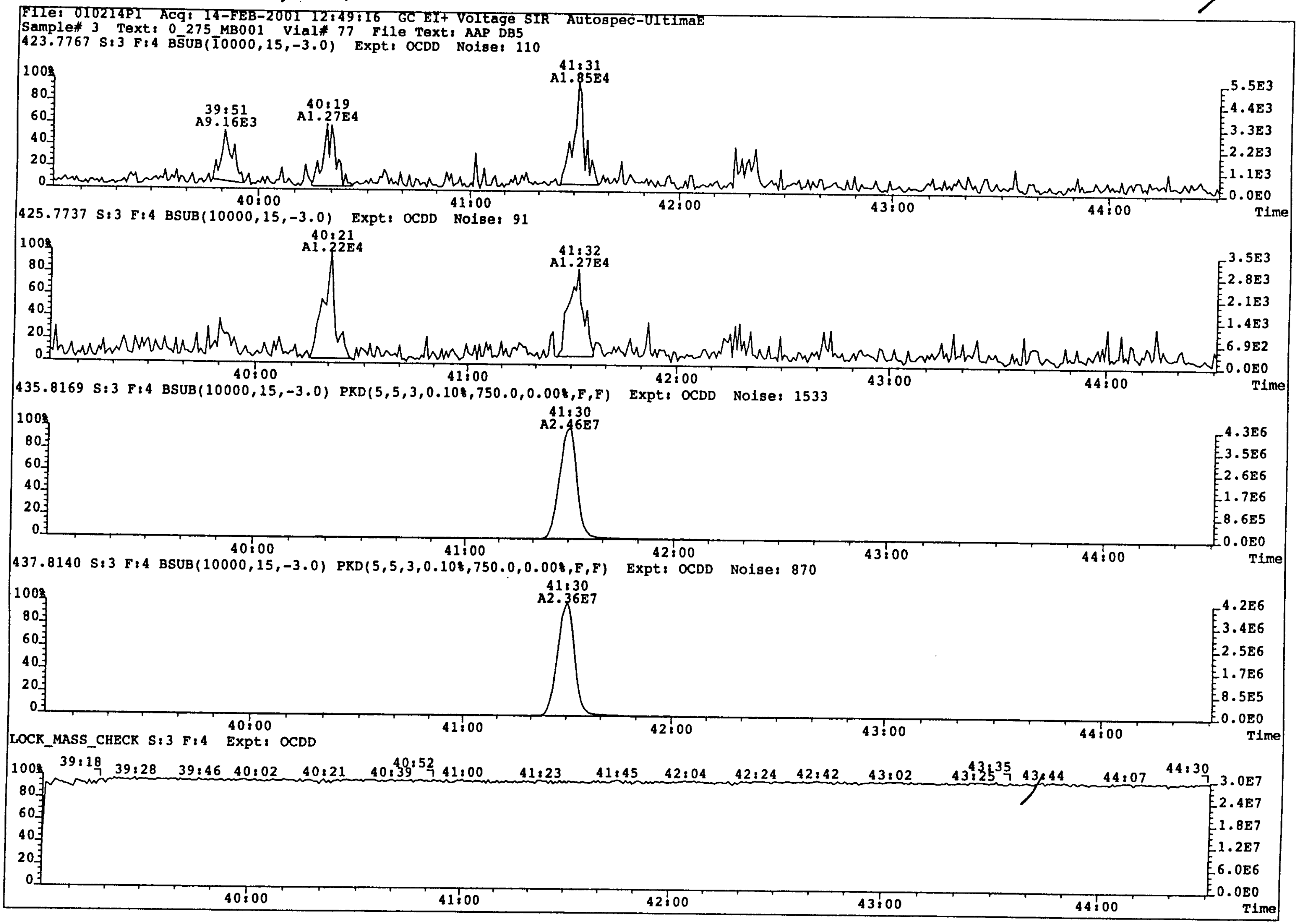
369.8919 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 321

366.9792 S:3 F:2 Expt: OCDD



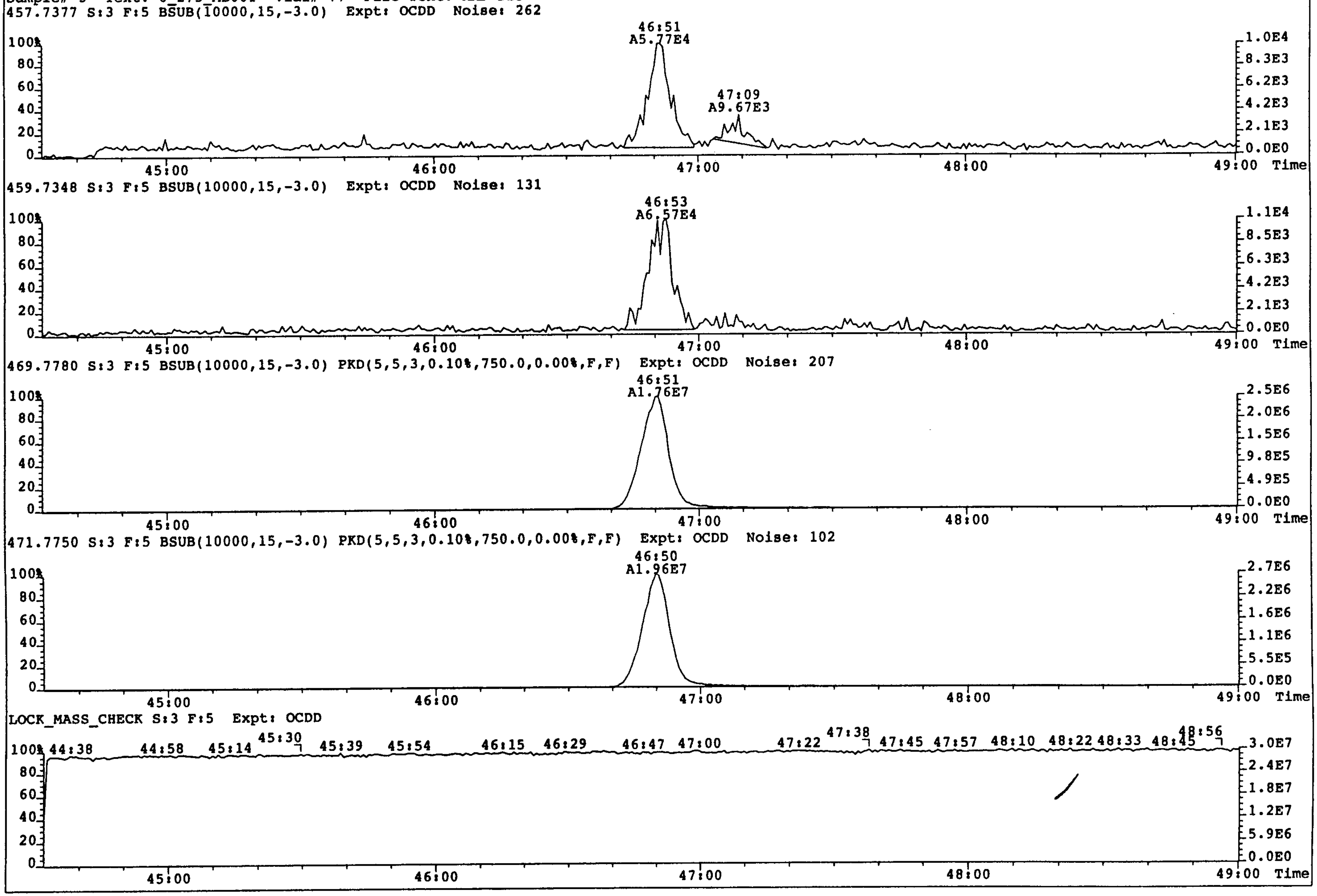
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5



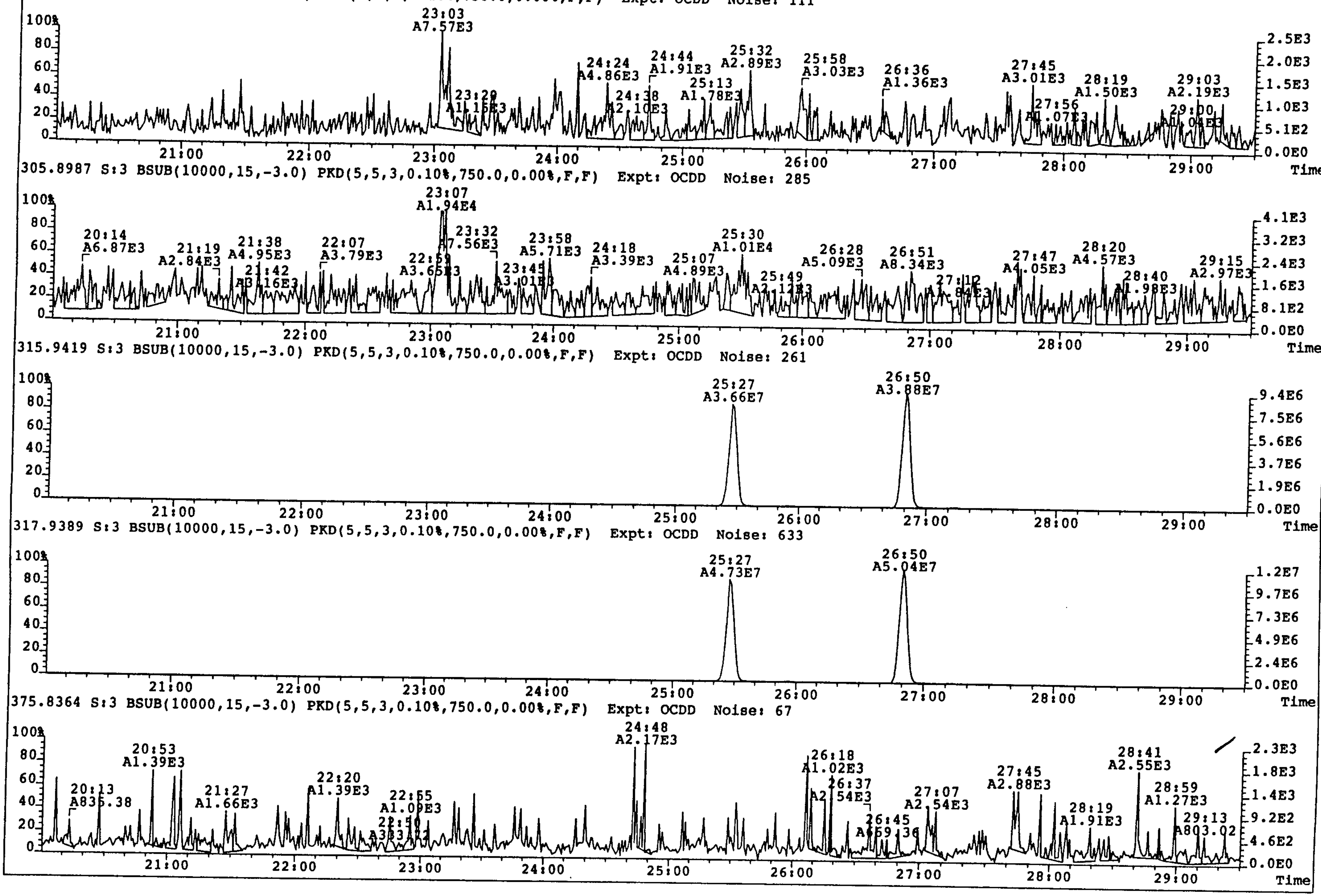


File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
423.7767 S:3 F:4 BSUB(10000,15,-3.0) Expt: OCDD Noise: 110
39:51 A9.16E3
40:19 A1.27E4
41:31 A1.85E4
425.7737 S:3 F:4 BSUB(10000,15,-3.0) Expt: OCDD Noise: 91
40:21 A1.22E4
41:32 A1.27E4
435.8169 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1533
41:30 A2.46E7
437.8140 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 870
41:30 A2.36E7
LOCK_MASS_CHECK S:3 F:4 Expt: OCDD
39:18 39:28 39:46 40:02 40:21 40:39 40:52 41:00 41:23 41:45 42:04 42:24 42:42 43:02 43:25 43:35 43:44 44:07 44:30
40:00
41:00
42:00
43:00
44:00
Time

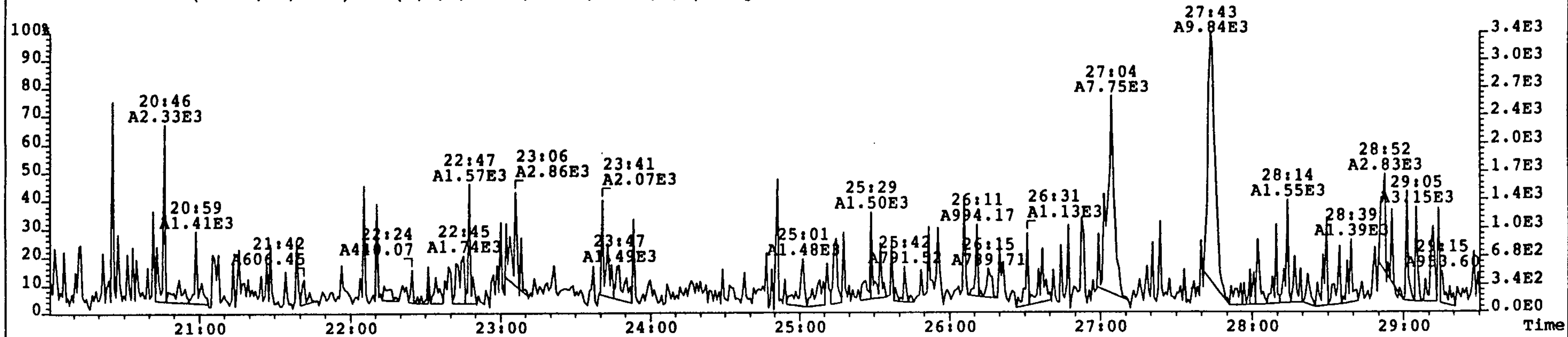
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5



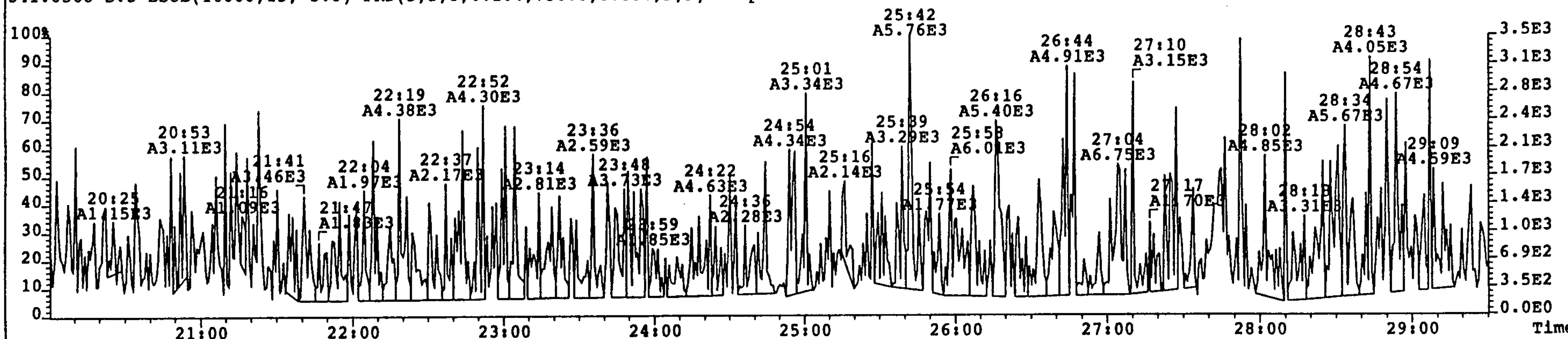
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
303.9016 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 111



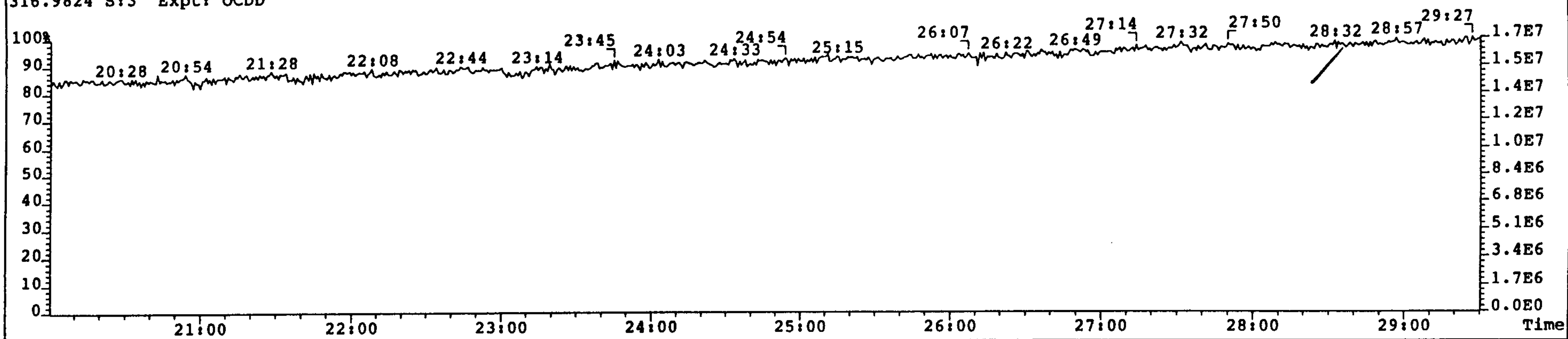
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
339.8597 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 71



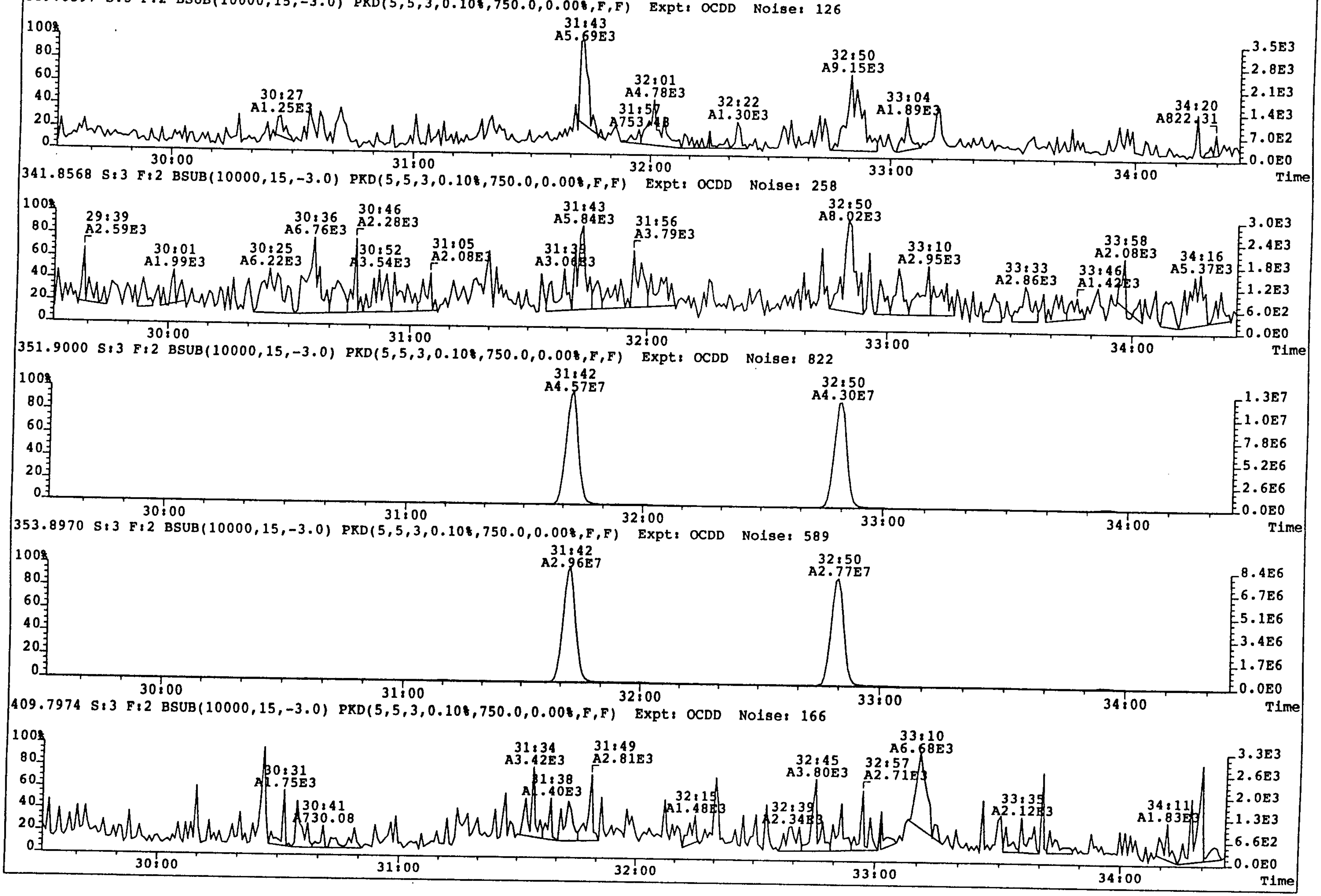

341.8568 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 170

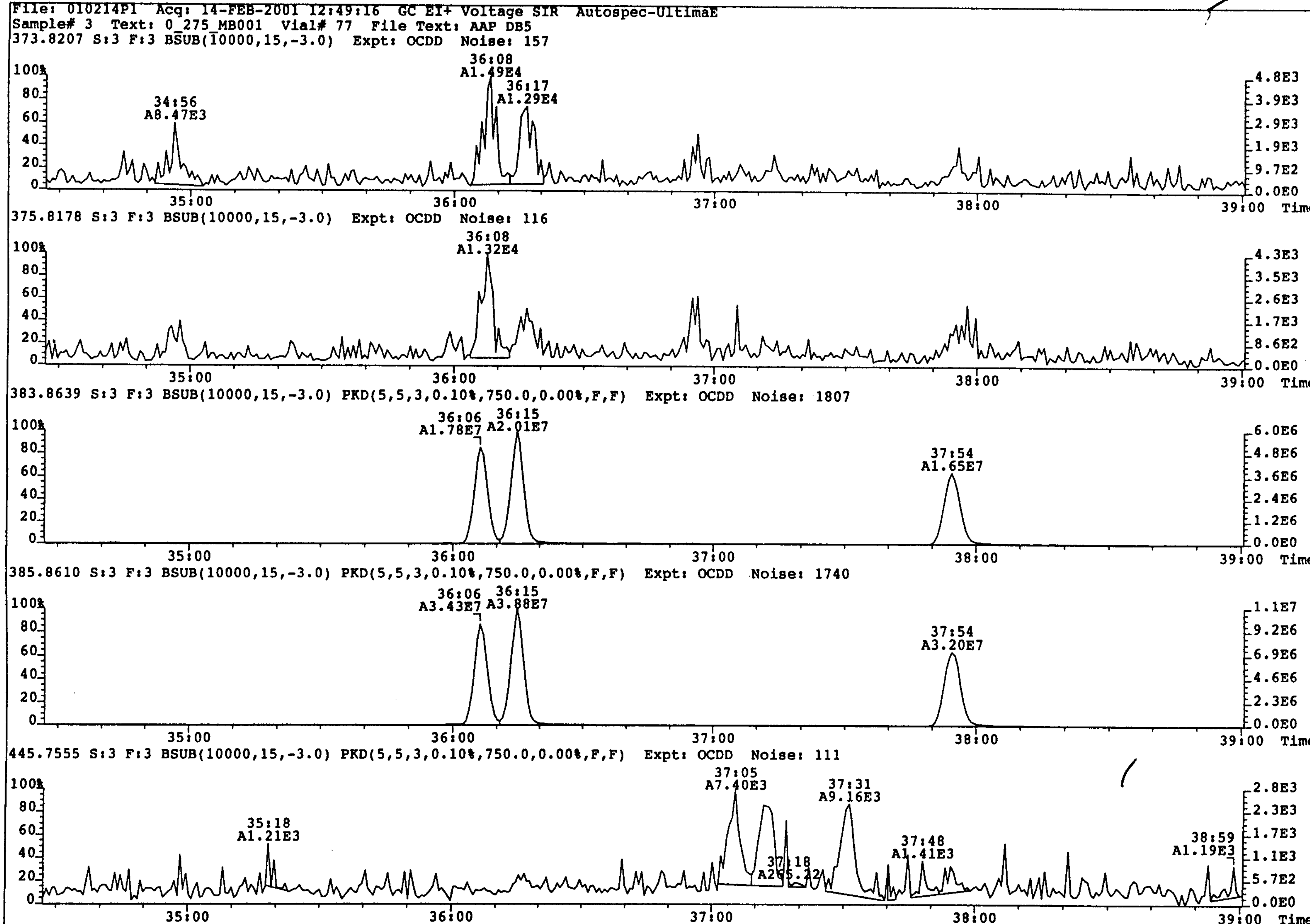


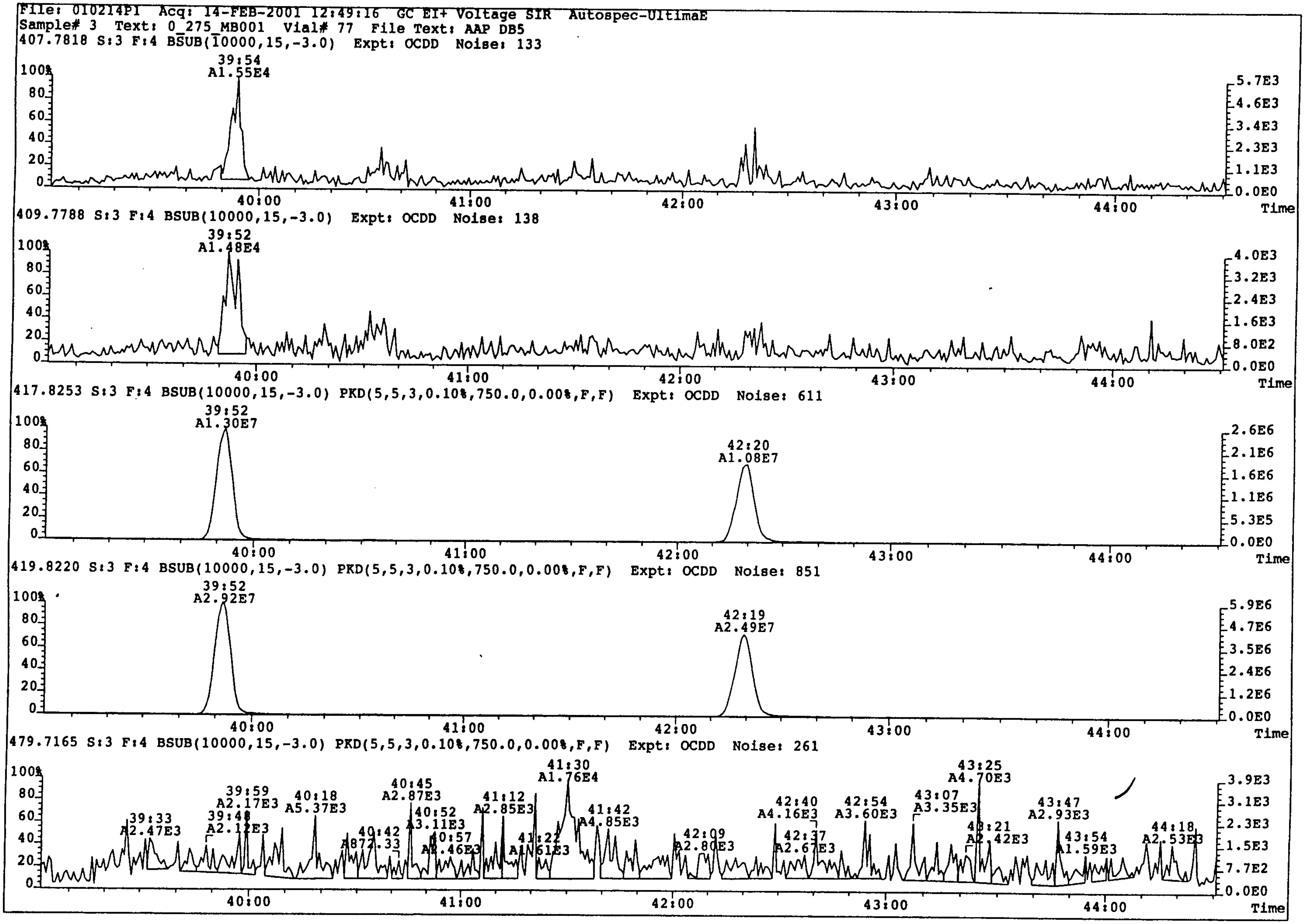

316.9824 S:3 Expt: OCDD



File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5

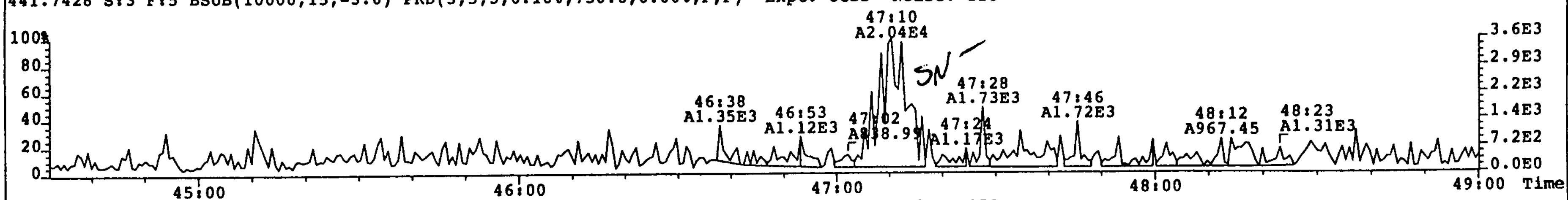



File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
373.8207 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 157
34:56
A8.47E3
36:08
A1.49E4
36:17
A1.29E4
4.8E3
3.9E3
2.9E3
1.9E3
9.7E2
0.0E0
375.8178 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 116
36:08
A1.32E4
4.3E3
3.5E3
2.6E3
1.7E3
8.6E2
0.0E0
383.8639 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1807
36:06
A1.78E7
36:15
A2.01E7
37:54
A1.65E7
6.0E6
4.8E6
3.6E6
2.4E6
1.2E6
0.0E0
385.8610 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1740
36:06
A3.43E7
36:15
A3.88E7
37:54
A3.20E7
1.1E7
9.2E6
6.9E6
4.6E6
2.3E6
0.0E0
445.7555 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 111
35:18
A1.21E3
37:05
A7.40E3
37:18
A265.22
37:31
A9.16E3
37:48
A1.41E3
38:59
A1.19E3
2.8E3
2.3E3
1.7E3
1.1E3
5.7E2
0.0E0
100%
80
60
40
20
0
35:00
36:00
37:00
38:00
39:00
Time

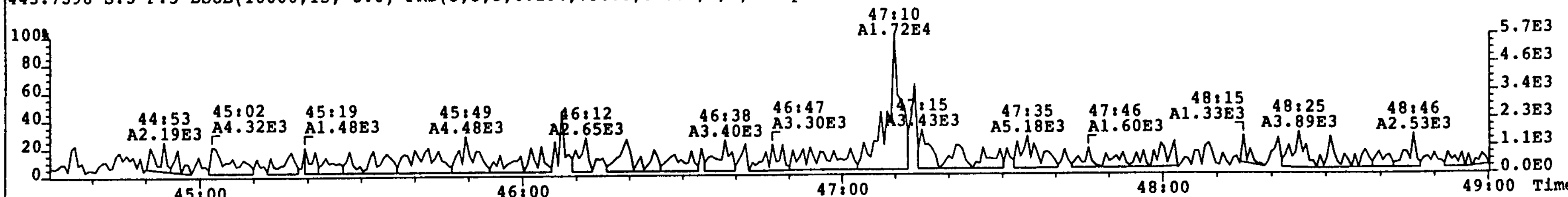

File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
407.7818 S:3 F:4 BSUB(10000,15,-3.0) Expt: OCDD Noise: 133
39:54
A1.55E4
409.7788 S:3 F:4 BSUB(10000,15,-3.0) Expt: OCDD Noise: 138
39:52
A1.48E4
417.8253 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 611
39:52
A1.30E7
42:20
A1.08E7
419.8220 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 851
39:52
A2.92E7
42:19
A2.49E7
479.7165 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 261
39:33
A2.47E3
39:48
A2.12E3
39:59
A2.17E3
40:18
A5.37E3
40:42
A872.33
40:45
A2.87E3
40:52
A3.11E3
40:57
A2.46E3
41:12
A2.85E3
41:22
A1.61E3
41:30
A1.76E4
41:42
A4.85E3
42:09
A2.80E3
42:37
A2.67E3
42:40
A4.16E3
42:54
A3.60E3
43:07
A3.35E3
43:21
A2.42E3
43:25
A4.70E3
43:47
A2.93E3
43:54
A1.59E3
44:18
A2.53E3
100%
80
60
40
20
0
40:00
41:00
42:00
43:00
44:00
Time
5.7E3
4.6E3
3.4E3
2.3E3
1.1E3
0.0E0
4.0E3
3.2E3
2.4E3
1.6E3
8.0E2
2.6E6
2.1E6
1.6E6
1.1E6
5.3E5
5.9E6
4.7E6
3.5E6
2.4E6
1.2E6
3.9E3
3.1E3
2.3E3
1.5E3
7.7E2

File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5

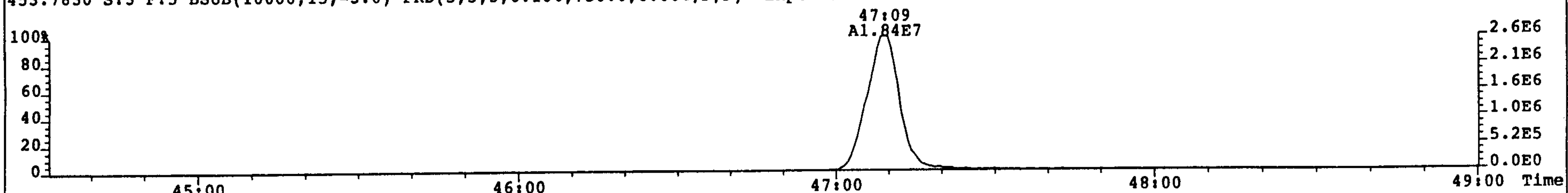
441.7428 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 118



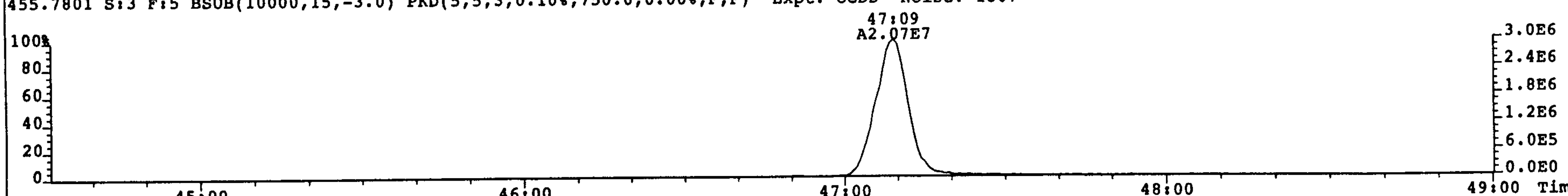

443.7398 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 178



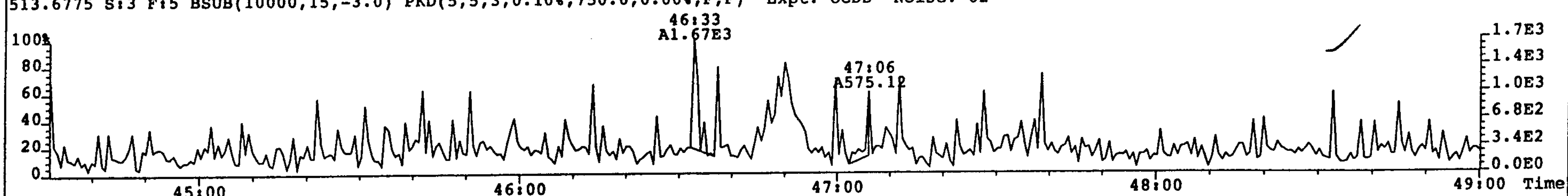

453.7830 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 95




455.7801 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1307




513.6775 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 82



# Sample ID: M23-1

## Method M23

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | PES | Matrix: | Air | Project No.: | P1388 | Date Received: | 6-Feb-01 |
| Project ID: | F181.001 | Weight/Volume: | 1 | Sample ID: | P1388_275_001CU | Date Extracted: | 8-Feb-01 |
| Date Collected: | 31-Jan-01 | | | QC Batch No.: | 275 | Date Analyzed: | 23-FEB-01 |

| Analyte | Conc. pg | DL pg | EMPC pg | Qualifier | Recoveries IS | Recoveries SS | Recoveries AS |
|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | ND | 0.792 | | | 102 | 96.5 | 97.9 |
| 1,2,3,7,8-PeCDD | EMPC | | 1.74 | A | 99.7 | 93.1 | 97.9 |
| 1,2,3,4,7,8-HxCDD | 4.56 | | | A | 104 | 91.1 | 97.9 |
| 1,2,3,6,7,8-HxCDD | 7.58 | | | A | 104 | 91.1 | 97.9 |
| 1,2,3,7,8,9-HxCDD | 4.64 | | | A | 104 | 91.1 | 97.9 |
| 1,2,3,4,6,7,8-HpCDD | 27.3 | | | A B | 96.5 | 90.3 | 97.9 |
| OCDD | 74.4 | | | A B | 83.6 | 90.3 | 97.9 |
| 2,3,7,8-TCDF | 11.3 | | | | 100 | 96.5 | 97.9 |
| 1,2,3,7,8-PeCDF | 20.9 | | | A | 91.1 | 93.1 | 97.9 |
| 2,3,4,7,8-PeCDF | 46.6 | | | A | 91.1 | 93.1 | 97.9 |
| 1,2,3,4,7,8-HxCDF | 48.9 | | | A B | 90.7 | 96.9 | 97.9 |
| 1,2,3,6,7,8-HxCDF | 54.6 | | | | 90.7 | 96.9 | 97.9 |
| 2,3,4,6,7,8-HxCDF | 87.3 | | | | 90.7 | 96.9 | 97.9 |
| 1,2,3,7,8,9-HxCDF | 13.7 | | | A | 90.7 | 96.9 | 97.9 |
| 1,2,3,4,6,7,8-HpCDF | 234 | | | B | 86 | 90.3 | 97.9 |
| 1,2,3,4,7,8,9-HpCDF | 26.5 | | | A | 86 | 90.3 | 97.9 |
| OCDF | 145 | | | | 81.3 | 90.3 | 97.9 |

| Totals & TEQs | Conc. pg | DL pg | EMPC pg | Qualifier |
|---|---|---|---|---|
| TCDDs | 17.3 | | | |
| PeCDDs | 41.3 | | 48.5 | |
| HxCDDs | 68.2 | | | |
| HpCDDs | 55.6 | | | |
| TCDFs | 345 | | 370 | |
| PeCDFs | 451 | | 456 | |
| HxCDFs | 517 | | | |
| HpCDFs | 370 | | | |
| **Total PCDD/Fs** | **2090** | | **2120** | |
| **TEQ (ND=0)** | **50.7** | | **51.5** | **ITEF** |
| **TEQ (ND=DL/2)** | **51.1** | | **51.9** | **ITEF** |


ALTA ANALYTICAL PERSPECTIVES

2714 Exchange Drive
Wilmington
North Carolina 28405
USA

Tel: 910 794-1613
Fax: 910 794-3919
e-mail: ytondeur@cs.com
web: www.ultratrace.com


Reviewer ..... a

Date ..... 25 Feb 01

OPUSquan 24-FEB-2001 15:46 Page 1

Client ID: M23-1 CU  Filename: 010223P1  S: 3  Acq: 23-FEB-01 13:01:16  ConCal: 010223P1-  Page 9 of 10
Lab ID: P1388_275_001CU  GC Column ID: db-5  ICal: MM1_M23_0:  wt/vol: 1.000  EndCal: 010223P1-

| | Name | Resp | RA | | RRF | RT | Conc | Qualif. | CDE | noise | Fac | DL | EMPC | Rec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2,3,7,8-TCDD | * | * | n | 1.26 | NotF: | * | | | 1110 | 2.5 | 0.792 | | |
| | 1,2,3,7,8-PeCDD | 2.93e+04 | 2.02 | n | 1.01 | 33:13 | 1.74 | | | 1185 | 2.5 | 1.70 | | |
| | 1,2,3,4,7,8-HxCDD | 7.04e+04 | 1.38 | y | 1.14 | 37:01 | 4.56 | | | 967 | 2.5 | 1.30 | | |
| | 1,2,3,6,7,8-HxCDD | 1.05e+05 | 1.33 | y | 1.02 | 37:08 | 7.58 | | | 967 | 2.5 | 1.45 | | |
| | 1,2,3,7,8,9-HxCDD | 7.20e+04 | 1.31 | y | 1.14 | 37:28 | 4.64 | | | 967 | 2.5 | 1.30 | | |
| | 1,2,3,4,6,7,8-HpCDD | 3.76e+05 | 1.09 | y | 1.13 | 41:26 | 27.3 | | | 1220 | 2.5 | 2.16 | | |
| | OCDD | 6.54e+05 | 0.92 | y | 1.03 | 46:45 | 74.4 | | | 885 | 2.5 | 2.92 | | |
| | 2,3,7,8-TCDF | 3.09e+05 | 0.69 | y | 1.05 | 26:48 | 11.3 | | | 1564 | 2.5 | 1.11 | | |
| | 1,2,3,7,8-PeCDF | 4.68e+05 | 1.49 | y | 1.04 | 31:39 | 20.9 | | | 1856 | 2.5 | 1.95 | | |
| | 2,3,4,7,8-PeCDF | 1.06e+06 | 1.55 | y | 1.05 | 32:46 | 46.6 | | | 1856 | 2.5 | 1.92 | | |
| | 1,2,3,4,7,8-HxCDF | 8.99e+05 | 1.18 | y | 1.13 | 36:03 | 48.9 | | | 1260 | 2.5 | 0.919 | | |
| | 1,2,3,6,7,8-HxCDF | 1.10e+06 | 1.25 | y | 1.24 | 36:11 | 54.6 | | | 1260 | 2.5 | 0.840 | | |
| | 2,3,4,6,7,8-HxCDF | 1.65e+06 | 1.20 | y | 1.16 | 36:51 | 87.3 | | | 1260 | 2.5 | 0.893 | | |
| | 1,2,3,7,8,9-HxCDF | 2.27e+05 | 1.34 | y | 1.02 | 37:53 | 13.7 | | | 1260 | 2.5 | 1.02 | | |
| | 1,2,3,4,6,7,8-HpCDF | 3.91e+06 | 1.01 | y | 1.54 | 39:48 | 234 | | | 1208 | 2.5 | 1.11 | | |
| | 1,2,3,4,7,8,9-HpCDF | 3.74e+05 | 1.04 | y | 1.30 | 42:15 | 26.5 | | | 1208 | 2.5 | 1.32 | | |
| | OCDF | 1.54e+06 | 0.89 | y | 1.15 | 47:04 | 145 | | | 1327 | 2.5 | 3.40 | | |
| | Total Tetra-Dioxins | 4.54e+05 | 0.79 | y | 1.26 | 23:58 | 17.3 | | | 1110 | 2.5 | 0.792 | 17.3 | |
| | Total Penta-Dioxins | 6.97e+05 | 1.60 | y | 1.01 | 30:36 | 41.3 | | | 1185 | 2.5 | 1.70 | 48.5 | |
| | Total Hexa-Dioxins | 1.02e+06 | 1.31 | y | 1.10 | 35:19 | 68.2 | | | 967 | 2.5 | 1.35 | 68.2 | |
| | Total Hepta-Dioxins | 7.67e+05 | 1.03 | y | 1.13 | 40:15 | 55.6 | | | 1220 | 2.5 | 2.16 | 55.6 | |
| | Total Tetra-Furans | 9.46e+06 | 0.72 | y | 1.05 | 21:46 | 345 | | | 1564 | 2.5 | 1.11 | 370 | |
| | 1st Fnc. Penta-Furans | 1.06e+06 | 1.64 | y | 1.05 | 28:50 | 46.8 | | | 4180 | 2.5 | 4.35 | 46.8 | |
| | Total Penta-Furans | 9.14e+06 | 1.51 | y | 1.05 | 30:22 | 405 | | | 1856 | 2.5 | 1.93 | | |
| | PeCDF Totals: | | | | | | 451 | | | | | | 456 | |
| | Total Hexa-Furans | 9.66e+06 | 1.20 | y | 1.14 | 34:40 | 517 | | | 1260 | 2.5 | 0.914 | 517 | |
| | Total Hepta-Furans | 5.97e+06 | 1.01 | y | 1.42 | 39:48 | 370 | | | 1208 | 2.5 | 1.20 | 370 | |
| IS | 13C-2,3,7,8-TCDD | 6.67e+07 | 0.80 | y | 1.13 | 27:41 | 3250 | | | | | | | 102 |
| IS | 13C-1,2,3,7,8-PeCDD | 5.34e+07 | 1.57 | y | 0.93 | 33:06 | 3190 | | | | | | | 99.7 |
| IS | 13C-1,2,3,6,7,8-HxCDD | 4.34e+07 | 1.25 | y | 0.93 | 37:08 | 3320 | | | | | | | 104 |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 3.91e+07 | 1.04 | y | 0.91 | 41:25 | 3090 | | | | | | | 96.5 |
| IS | 13C-OCDD | 2.74e+07 | 0.89 | y | 0.73 | 46:44 | 2680 | | | | | | | 83.6 |
| IS | 13C-2,3,7,8-TCDF | 8.39e+07 | 0.79 | y | 1.06 | 26:48 | 3200 | | | | | | | 100 |
| IS | 13C-1,2,3,7,8-PeCDF | 6.91e+07 | 1.56 | y | 0.96 | 31:38 | 2920 | | | | | | | 91.1 |
| IS | 13C-1,2,3,6,7,8-HxCDF | 5.20e+07 | 0.52 | y | 1.28 | 36:10 | 2900 | | | | | | | 90.7 |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 3.47e+07 | 0.44 | y | 0.90 | 39:47 | 2750 | | | | | | | 86.0 |
| IS | 13C-OCDF | 2.95e+07 | 0.88 | y | 0.81 | 47:03 | 2600 | | | | | | | 81.3 |
| RS/RT | 13C-1,2,3,4-TCDD | 5.78e+07 | 0.79 | y | 1.00 | 27:01 | 3200 | | | | | | | - |
| RS | 13C-1,2,3,4-TCDF | 7.91e+07 | 0.78 | y | 1.00 | 25:25 | 3200 | | | | | | | - |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD | 4.47e+07 | 1.25 | y | 1.00 | 37:26 | 3200 | | | | | | | - |
| PS | 37Cl-2,3,7,8-TCDD | 3.31e+07 | | | 0.51 | 27:42 | 3090 | | | | | | | 96.5 |
| PS | 13C-2,3,4,7,8-PeCDF | 6.26e+07 | 1.58 | y | 0.97 | 32:45 | 2980 | | | | | | | 93.1 |
| PS | 13C-1,2,3,4,7,8-HxCDD | 3.64e+07 | 1.25 | y | 0.92 | 37:00 | 2910 | | | | | | | 91.1 |
| PS | 13C-1,2,3,4,7,8-HxCDF | 4.59e+07 | 0.51 | y | 0.91 | 36:02 | 3100 | | | | | | | 96.9 |
| PS | 13C-1,2,3,4,7,8,9-HpCDF | 2.68e+07 | 0.43 | y | 0.85 | 42:14 | 2890 | | | | | | | 90.3 |
| AS | 13C-1,2,3,7,8,9-HxCDF | 4.68e+07 | 0.52 | y | 1.07 | 37:50 | 3130 | | | | | | | 97.9 |

Reviewer: Ce

Date: 25 Feb 01

Analyst: GAG

Date: 24 Feb 01

Page 2 of 18

Totals class: TCDD EMPC Function: 1 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 17.275 Unnamed Conc.: 17.275

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23:58 | 5.749e+04 | y | 7.279e+04 | y | 0.79 | y | 1.303e+05 | 1.303e+05 | 1.40e+01 | y | 4.96 | |
| 24:20 | 3.290e+04 | y | 4.072e+04 | y | 0.81 | y | 7.361e+04 | 7.361e+04 | 7.55e+00 | y | 2.80 | |
| 24:46 | 2.128e+04 | y | 3.106e+04 | y | 0.69 | y | 5.234e+04 | 5.234e+04 | 6.00e+00 | y | 1.99 | |
| 25:50 | 4.864e+04 | y | 5.857e+04 | y | 0.83 | y | 1.072e+05 | 1.072e+05 | 9.81e+00 | y | 4.08 | |
| 27:25 | 3.946e+04 | y | 5.103e+04 | y | 0.77 | y | 9.049e+04 | 9.049e+04 | 8.18e+00 | y | 3.44 | |

Page 4 of 18

Totals class: PeCDD EMPC Function: 2 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 48.519 Unnamed Conc.: 46.781

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30:36 | 1.324e+05 | y | 8.277e+04 | y | 1.60 | y | 2.151e+05 | 2.151e+05 | 1.49e+01 | y | 12.7 | |
| 31:08 | 2.218e+04 | y | 1.291e+04 | y | 1.72 | y | 3.509e+04 | 3.509e+04 | 3.23e+00 | y | 2.08 | |
| 31:41 | 9.365e+04 | y | 5.601e+04 | y | 1.67 | y | 1.497e+05 | 1.497e+05 | 1.30e+01 | y | 8.86 | |
| 31:52 | 2.066e+04 | y | 1.711e+04 | y | 1.21 | n | 3.777e+04 | 3.398e+04 | 5.06e+00 | y | 2.01 | |
| 31:59 | 5.095e+04 | y | 3.112e+04 | y | 1.64 | y | 8.208e+04 | 8.208e+04 | 9.15e+00 | y | 4.86 | |
| 32:14 | 5.054e+04 | y | 3.510e+04 | y | 1.44 | y | 8.564e+04 | 8.564e+04 | 6.62e+00 | y | 5.07 | |
| 32:37 | 4.816e+04 | n | 3.418e+04 | y | 1.41 | y | 8.235e+04 | 8.235e+04 | 8.90e+00 | y | 4.88 | |
| 33:07 | 3.585e+04 | y | 2.776e+04 | y | 1.29 | n | 6.362e+04 | 5.899e+04 | 7.53e+00 | y | 3.49 | |
| 33:13 | 2.321e+04 | y | 1.151e+04 | y | 2.02 | n | 3.472e+04 | 2.935e+04 | 3.02e+00 | y | 1.74 | 1,2,3,7,8-PeCDD |
| 33:34 | 2.919e+04 | y | 1.782e+04 | y | 1.64 | y | 4.702e+04 | 4.702e+04 | 4.04e+00 | y | 2.78 | |

Page 6 of 18

Totals class: HxCDD EMPC Function: 3 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 68.237 Unnamed Conc.: 51.453

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35:19 | 7.959e+04 | n | 6.088e+04 | n | 1.31 | y | 1.405e+05 | 1.405e+05 | 1.71e+01 | y | 9.41 | |
| 35:58 | 1.502e+05 | y | 1.132e+05 | y | 1.33 | y | 2.634e+05 | 2.634e+05 | 3.42e+01 | y | 17.6 | |
| 36:16 | 1.388e+05 | y | 1.118e+05 | y | 1.24 | y | 2.506e+05 | 2.506e+05 | 2.64e+01 | y | 16.8 | |
| 36:23 | 2.866e+04 | y | 2.107e+04 | y | 1.36 | y | 4.973e+04 | 4.973e+04 | 7.59e+00 | y | 3.33 | |
| 37:01 | 4.088e+04 | y | 2.953e+04 | y | 1.38 | y | 7.041e+04 | 7.041e+04 | 1.07e+01 | y | 4.56 | 1,2,3,4,7,8-HxCDD |

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37:08 | 6.002e+04 | y | 4.510e+04 | y | 1.33 | y | 1.051e+05 | 1.051e+05 | 1.19e+01 | y | 7.58 | 1,2,3,6,7,8-HxCDD |
| 37:21 | 3.341e+04 | y | 3.075e+04 | y | 1.09 | y | 6.416e+04 | 6.416e+04 | 8.25e+00 | y | 4.30 | |
| 37:28 | 4.083e+04 | n | 3.114e+04 | y | 1.31 | y | 7.197e+04 | 7.197e+04 | 7.91e+00 | y | 4.64 | 1,2,3,7,8,9-HxCDD |

Page 8 of 18

Totals class: HpCDD EMPC Function: 4 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 55.576 Unnamed Conc.: 28.312

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40:15 | 1.979e+05 | n | 1.927e+05 | n | 1.03 | y | 3.906e+05 | 3.906e+05 | 3.19e+01 | y | 28.3 | |
| 41:26 | 1.957e+05 | n | 1.804e+05 | n | 1.09 | y | 3.761e+05 | 3.761e+05 | 3.05e+01 | y | 27.3 | 1,2,3,4,6,7,8-HpCDD |

Page 10 of 18

Totals class: TCDF EMPC Function: 1 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 369.52 Unnamed Conc.: 358.236

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21:46 | 1.185e+05 | n | 1.653e+05 | n | 0.72 | y | 2.838e+05 | 2.838e+05 | 1.82e+01 | y | 10.3 | |
| 22:21 | 9.414e+04 | n | 1.250e+05 | n | 0.75 | y | 2.192e+05 | 2.192e+05 | 1.39e+01 | y | 7.99 | |
| 23:01 | 1.592e+05 | n | 2.202e+05 | n | 0.72 | y | 3.794e+05 | 3.794e+05 | 2.68e+01 | y | 13.8 | |
| 23:32 | 4.850e+05 | y | 6.572e+05 | y | 0.74 | y | 1.142e+06 | 1.142e+06 | 4.51e+01 | y | 41.7 | |
| 23:55 | 3.308e+05 | y | 4.326e+05 | y | 0.76 | y | 7.634e+05 | 7.634e+05 | 3.18e+01 | y | 27.8 | |
| 24:21 | 1.655e+05 | y | 1.998e+05 | y | 0.83 | y | 3.653e+05 | 3.653e+05 | 2.57e+01 | y | 13.3 | |
| 24:30 | 7.081e+04 | y | 1.107e+05 | y | 0.64 | n | 1.815e+05 | 1.628e+05 | 1.40e+01 | y | 5.94 | |
| 24:40 | 1.038e+05 | y | 1.364e+05 | y | 0.76 | y | 2.402e+05 | 2.402e+05 | 1.81e+01 | y | 8.76 | |
| 25:03 | 1.299e+05 | y | 1.760e+05 | y | 0.74 | y | 3.059e+05 | 3.059e+05 | 2.33e+01 | y | 11.2 | |
| 25:11 | 2.686e+05 | y | 3.484e+05 | y | 0.77 | y | 6.170e+05 | 6.170e+05 | 4.65e+01 | y | 22.5 | |
| 25:25 | 7.666e+05 | y | 1.007e+06 | y | 0.76 | y | 1.774e+06 | 1.774e+06 | 8.16e+01 | y | 64.7 | |
| 25:54 | 1.564e+05 | y | 2.080e+05 | y | 0.75 | y | 3.644e+05 | 3.644e+05 | 2.77e+01 | y | 13.3 | |
| 26:01 | 2.236e+04 | y | 3.275e+04 | y | 0.68 | y | 5.511e+04 | 5.511e+04 | 6.19e+00 | y | 2.01 | |
| 26:11 | 1.167e+05 | y | 1.654e+05 | y | 0.71 | y | 2.821e+05 | 2.821e+05 | 2.33e+01 | y | 10.3 | |
| 26:23 | 2.310e+05 | n | 3.303e+05 | y | 0.70 | y | 5.612e+05 | 5.612e+05 | 4.07e+01 | y | 20.5 | |
| 26:35 | 2.698e+05 | y | 3.392e+05 | y | 0.80 | y | 6.090e+05 | 6.090e+05 | 4.75e+01 | y | 22.2 | |
| 26:42 | 1.953e+05 | y | 3.041e+05 | y | 0.64 | n | 4.994e+05 | 4.489e+05 | 4.43e+01 | y | 16.4 | |
| 26:48 | 1.266e+05 | y | 1.827e+05 | y | 0.69 | y | 3.093e+05 | 3.093e+05 | 2.51e+01 | y | 11.3 | 2,3,7,8-TCDF |
| 27:11 | 4.434e+05 | n | 6.020e+05 | n | 0.74 | y | 1.045e+06 | 1.045e+06 | 8.82e+01 | y | 38.1 | |
| 27:26 | 2.648e+04 | y | 4.648e+04 | y | 0.57 | n | 7.297e+04 | 6.088e+04 | 6.01e+00 | y | 2.22 | |
| 27:43 | 3.046e+04 | n | 3.847e+04 | y | 0.79 | y | 6.894e+04 | 6.894e+04 | 5.35e+00 | y | 2.51 | |
| 28:51 | 3.107e+04 | y | 4.395e+04 | n | 0.71 | y | 7.502e+04 | 7.502e+04 | 6.48e+00 | y | 2.74 | |

Page 12 of 18

Totals class: 1st Fnc.PeCDF EMPC Function: 1 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 46.757 Unnamed Conc.: 46.757

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28:50 | 6.559e+05 | n | 3.996e+05 | n | 1.64 | y | 1.055e+06 | 1.055e+06 | 2.00e+01 | y | 46.8 | |



Totals class: PeCDF EMPC Function: 2 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 409.15 Unnamed Conc.: 341.683

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30:22 | 7.295e+05 | y | 4.825e+05 | y | 1.51 | y | 1.212e+06 | 1.212e+06 | 1.00e+00 | n | 53.7 | |
| 30:31 | 7.874e+05 | y | 5.026e+05 | y | 1.57 | y | 1.290e+06 | 1.290e+06 | 9.67e-01 | n | 57.1 | |
| 30:38 | 1.972e+05 | y | 1.316e+05 | y | 1.50 | y | 3.288e+05 | 3.288e+05 | 3.49e-01 | n | 14.6 | |
| 30:44 | 6.448e+04 | y | 4.067e+04 | y | 1.59 | y | 1.051e+05 | 1.051e+05 | 1.23e-01 | n | 4.66 | |
| 30:58 | 1.158e+05 | y | 7.743e+04 | y | 1.50 | y | 1.933e+05 | 1.933e+05 | 1.83e-01 | n | 8.56 | |
| 31:07 | 1.859e+05 | y | 1.270e+05 | y | 1.46 | y | 3.129e+05 | 3.129e+05 | 4.36e-01 | n | 13.9 | |
| 31:13 | 8.298e+05 | y | 5.571e+05 | y | 1.49 | y | 1.387e+06 | 1.387e+06 | 1.04e+00 | n | 61.4 | |
| 31:27 | 1.904e+05 | n | 1.274e+05 | n | 1.50 | y | 3.178e+05 | 3.178e+05 | 3.71e-01 | n | 14.1 | |
| 31:39 | 2.803e+05 | n | 1.882e+05 | y | 1.49 | y | 4.685e+05 | 4.685e+05 | 2.89e+01 | y | 20.9 | 1,2,3,7,8-PeCDF |
| 31:56 | 5.285e+05 | n | 3.629e+05 | n | 1.46 | y | 8.914e+05 | 8.914e+05 | 6.52e-01 | n | 39.5 | |
| 32:30 | 5.696e+04 | y | 3.548e+04 | y | 1.61 | y | 9.243e+04 | 9.243e+04 | 1.18e-01 | n | 4.09 | |
| 32:39 | 8.356e+05 | n | 5.586e+05 | y | 1.50 | y | 1.394e+06 | 1.394e+06 | 1.57e+00 | n | 61.8 | |
| 32:46 | 6.440e+05 | y | 4.151e+05 | y | 1.55 | y | 1.059e+06 | 1.059e+06 | 5.69e+01 | y | 46.6 | 2,3,4,7,8-PeCDF |
| 33:06 | 6.309e+04 | y | 4.942e+04 | y | 1.28 | n | 1.125e+05 | 1.038e+05 | 1.21e-01 | n | 4.60 | |
| 33:51 | 4.986e+04 | y | 3.472e+04 | y | 1.44 | y | 8.458e+04 | 8.458e+04 | 1.03e-01 | n | 3.75 | |



Totals class: HxCDF EMPC Function: 3 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 517.26 Unnamed Conc.: 312.763

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 34:40 | 5.164e+05 | n | 4.299e+05 | n | 1.20 | y | 9.463e+05 | 9.463e+05 | 9.80e+01 | y | 51.1 | |
| 34:52 | 1.285e+06 | n | 1.082e+06 | n | 1.19 | y | 2.367e+06 | 2.367e+06 | 2.55e+02 | y | 128 | |
| 35:06 | 1.202e+05 | n | 1.012e+05 | n | 1.19 | y | 2.214e+05 | 2.214e+05 | 2.20e+01 | y | 12.0 | |
| 35:17 | 1.753e+05 | n | 1.393e+05 | n | 1.26 | y | 3.146e+05 | 3.146e+05 | 3.36e+01 | y | 17.0 | |
| 35:30 | 8.724e+04 | n | 6.709e+04 | n | 1.30 | y | 1.543e+05 | 1.543e+05 | 1.58e+01 | y | 8.34 | |
| 35:56 | 6.400e+05 | n | 5.010e+05 | n | 1.28 | y | 1.141e+06 | 1.141e+06 | 1.19e+02 | y | 61.7 | |
| 36:03 | 4.868e+05 | n | 4.120e+05 | n | 1.18 | y | 8.988e+05 | 8.988e+05 | 9.07e+01 | y | 48.9 | 1,2,3,4,7,8-HxCDF |
| 36:11 | 6.100e+05 | n | 4.891e+05 | n | 1.25 | y | 1.099e+06 | 1.099e+06 | 1.10e+02 | y | 54.6 | 1,2,3,6,7,8-HxCDF |
| 36:21 | 1.094e+05 | n | 8.865e+04 | n | 1.23 | y | 1.981e+05 | 1.981e+05 | 2.22e+01 | y | 10.7 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36:29 | 1.290e+05 | n | 1.086e+05 | n | 1.19 | y | 2.376e+05 | 2.376e+05 | 2.30e+01 | y | 12.8 | |
| 36:37 | 1.190e+05 | n | 8.713e+04 | n | 1.37 | y | 2.061e+05 | 2.061e+05 | 1.85e+01 | y | 11.1 | |
| 36:51 | 9.000e+05 | n | 7.522e+05 | n | 1.20 | y | 1.652e+06 | 1.652e+06 | 1.67e+02 | y | 87.3 | 2,3,4,6,7,8-HxCDF |
| 37:53 | 1.302e+05 | n | 9.724e+04 | n | 1.34 | y | 2.274e+05 | 2.274e+05 | 1.60e+01 | y | 13.7 | 1,2,3,7,8,9-HxCDF |



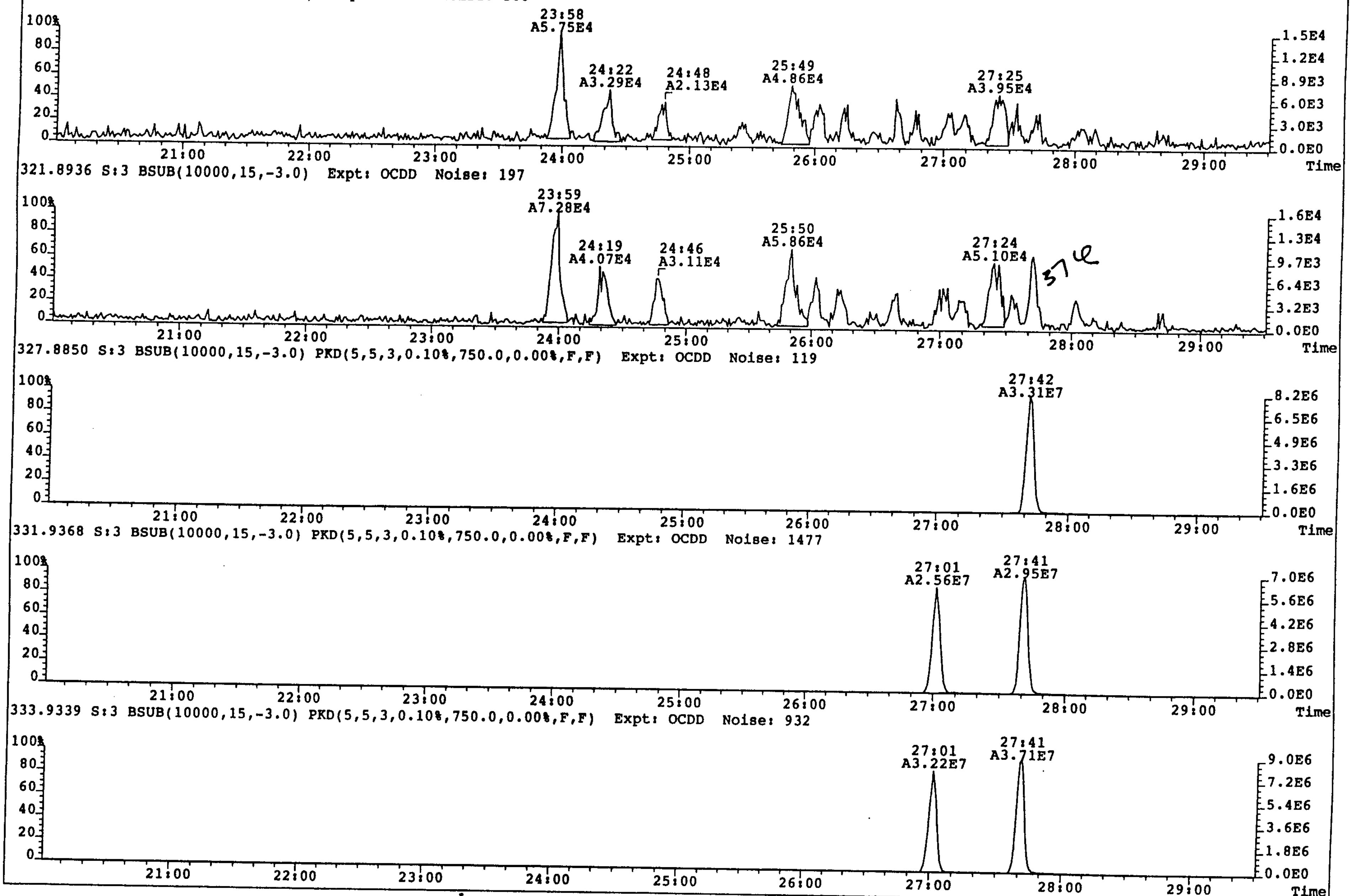
Totals class: HpCDF EMPC Function: 4 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

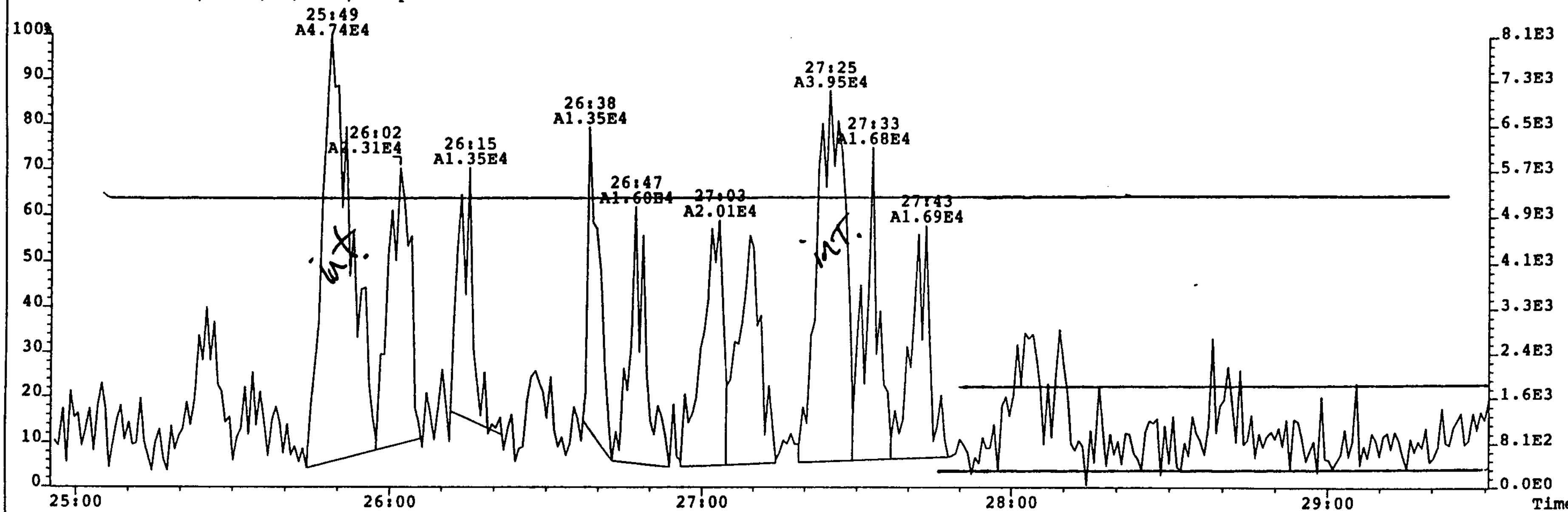
Total Conc.: 369.68 Unnamed Conc.: 109.495

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39:48 | 1.962e+06 | n | 1.948e+06 | n | 1.01 | y | 3.911e+06 | 3.911e+06 | 3.57e+02 | y | 234 | 1,2,3,4,6,7,8-HpCDF |
| 40:15 | 4.577e+05 | n | 4.686e+05 | n | 0.98 | y | 9.263e+05 | 9.263e+05 | 7.27e+01 | y | 60.1 | |
| 40:29 | 3.927e+05 | n | 3.693e+05 | n | 1.06 | y | 7.620e+05 | 7.620e+05 | 7.24e+01 | y | 49.4 | |
| 42:15 | 1.911e+05 | n | 1.832e+05 | n | 1.04 | y | 3.743e+05 | 3.743e+05 | 2.95e+01 | y | 26.5 | 1,2,3,4,7,8,9-HpCDF |

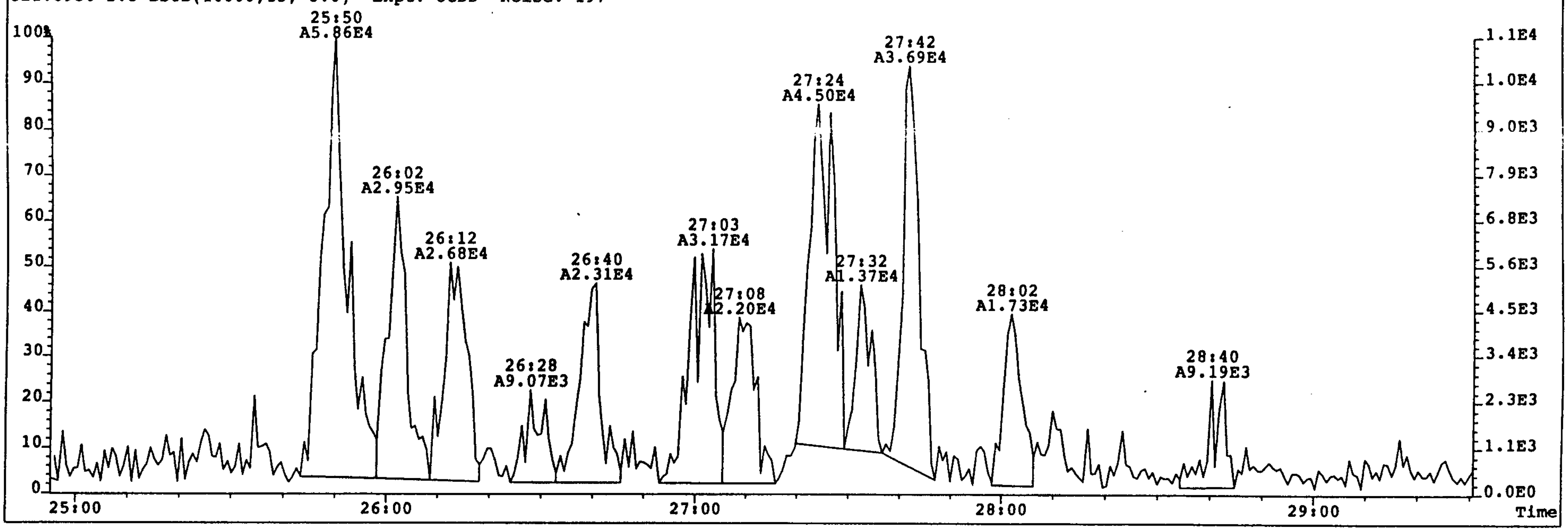
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
319.8965 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 300



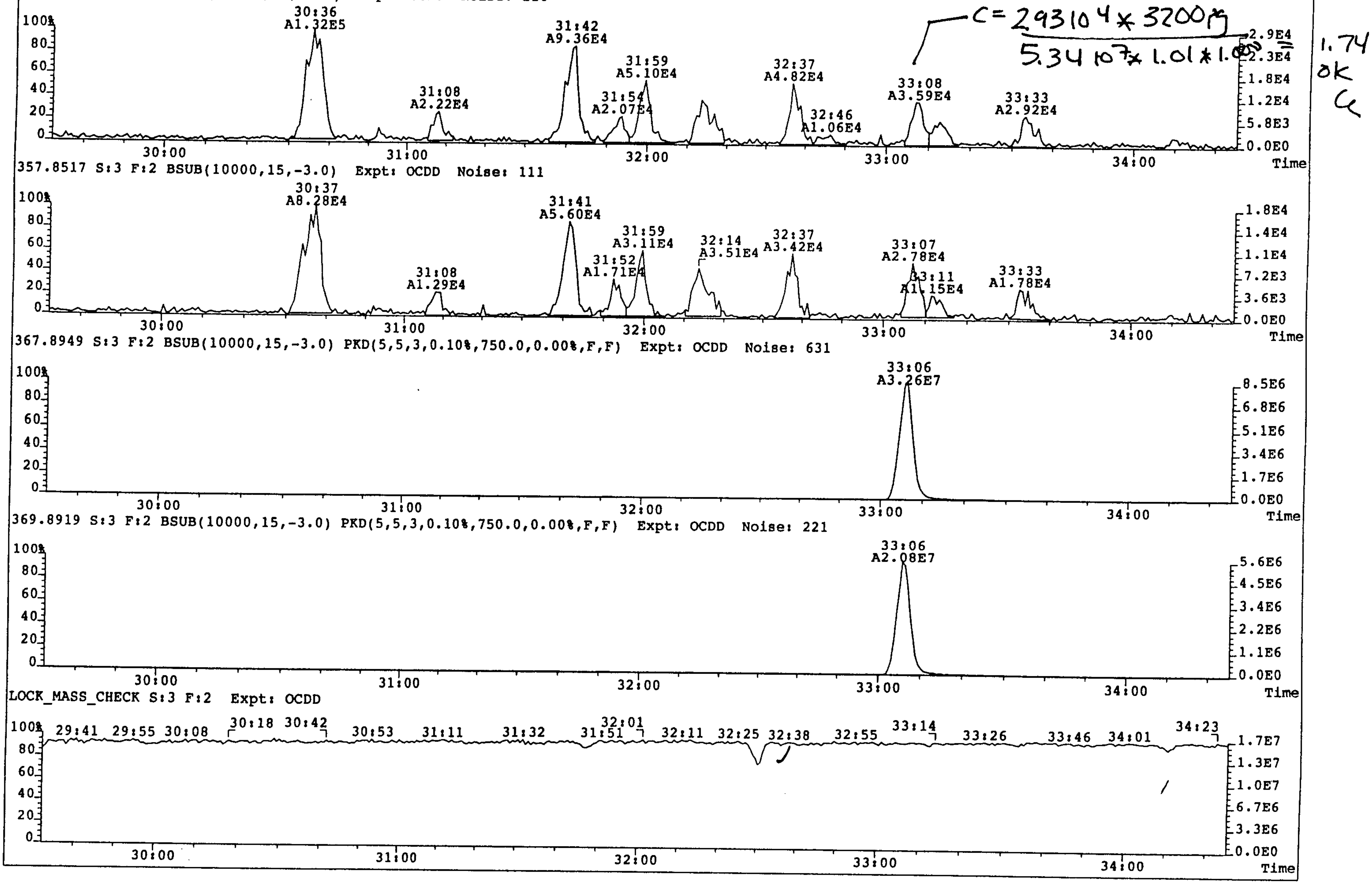
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
319.8965 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 300



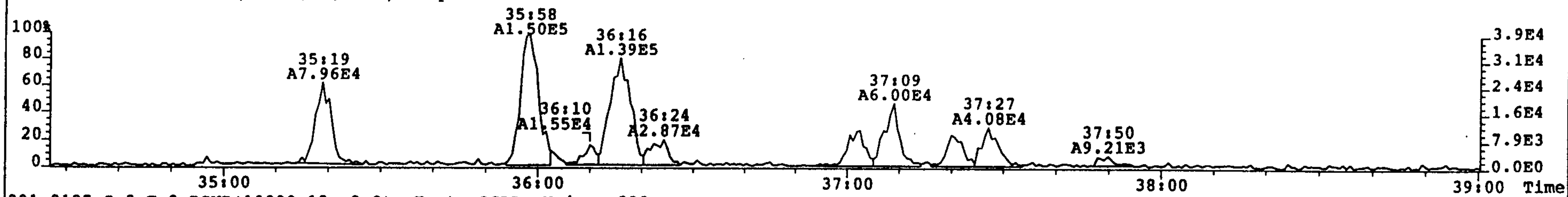

321.8936 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 197



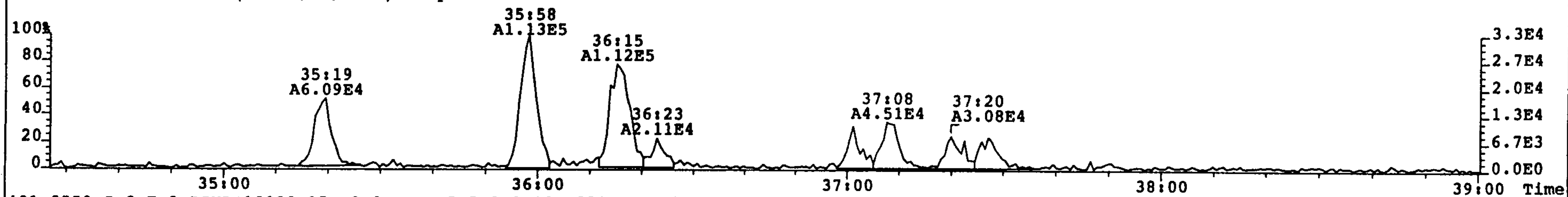
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
355.8546 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 210



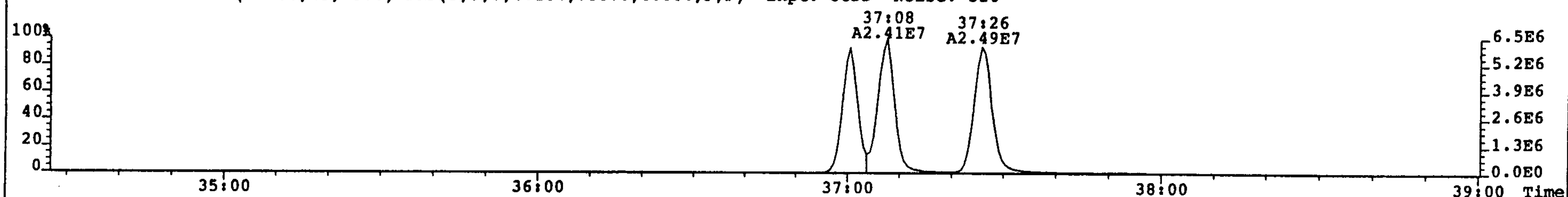
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
389.8156 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 315



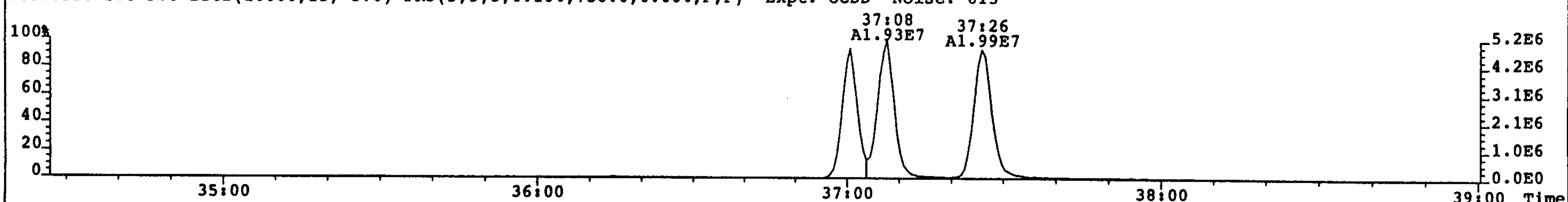

391.8127 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 223



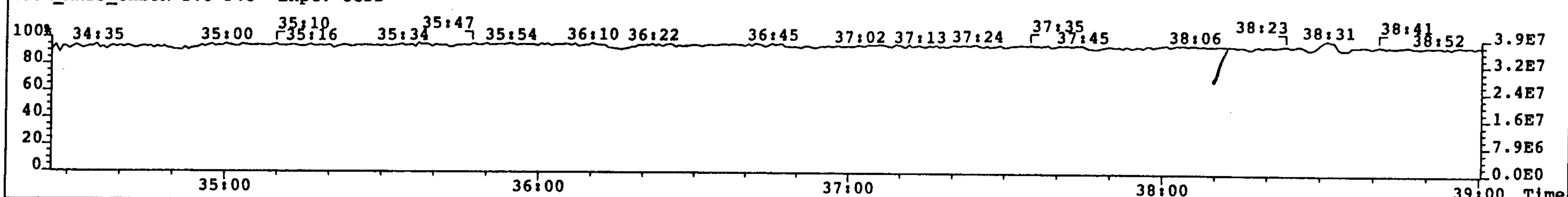

401.8559 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 520



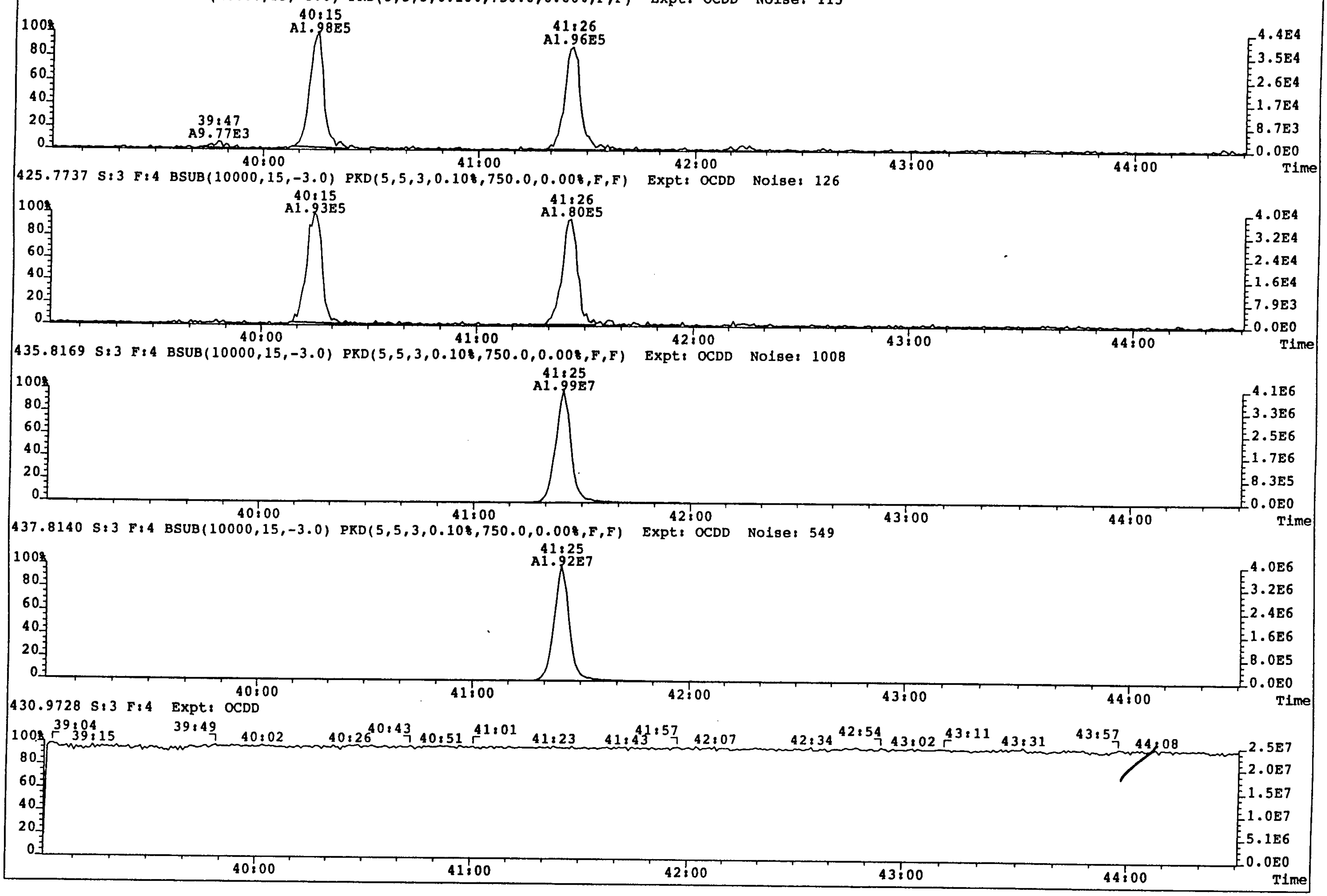

403.8530 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 615



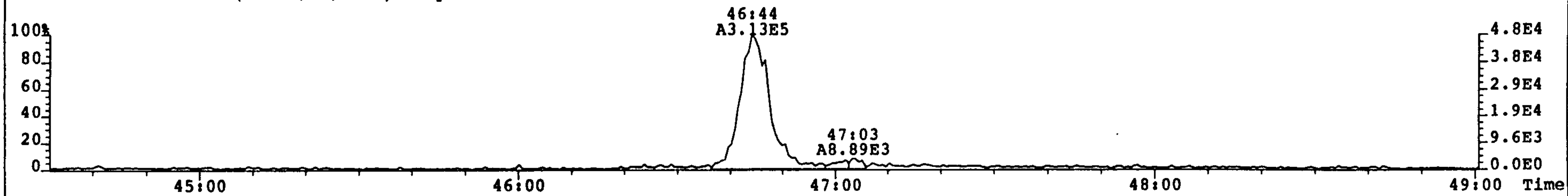

LOCK_MASS_CHECK S:3 F:3 Expt: OCDD



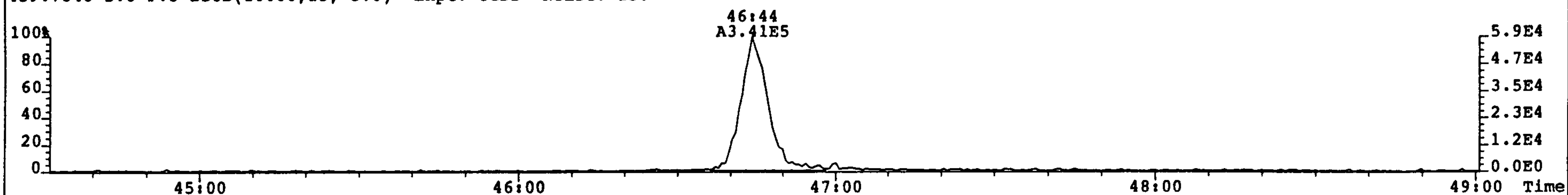
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
423.7767 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 115



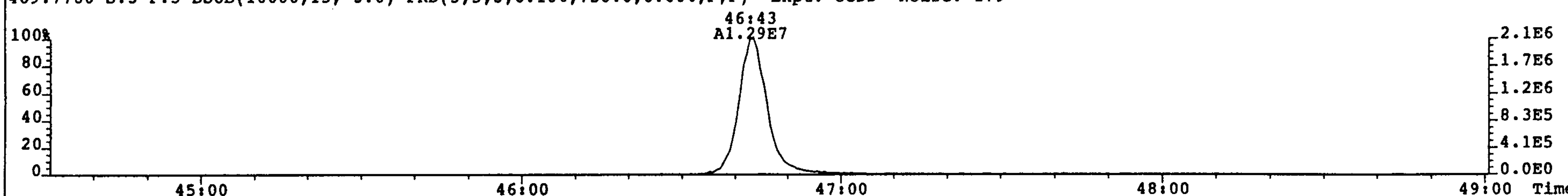
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
457.7377 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 211



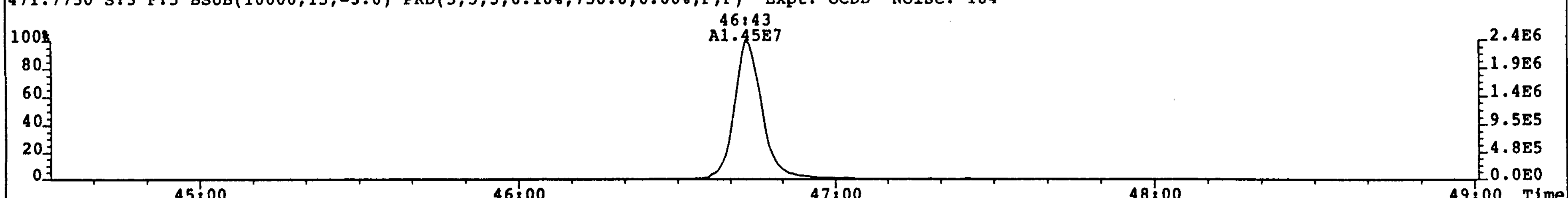

459.7348 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD · Noise: 130



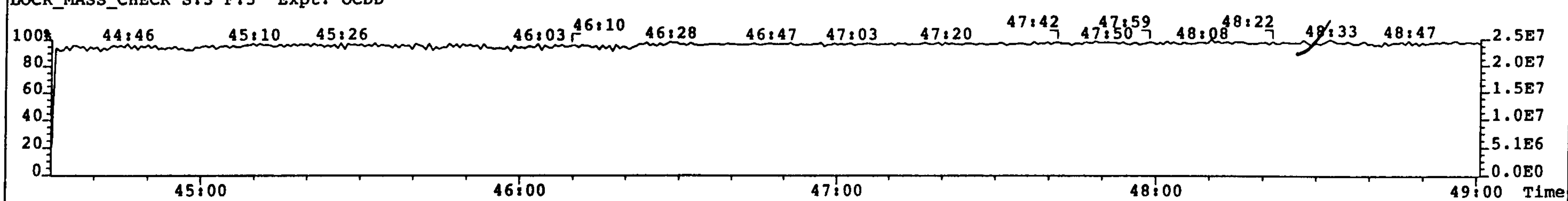

469.7780 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 179



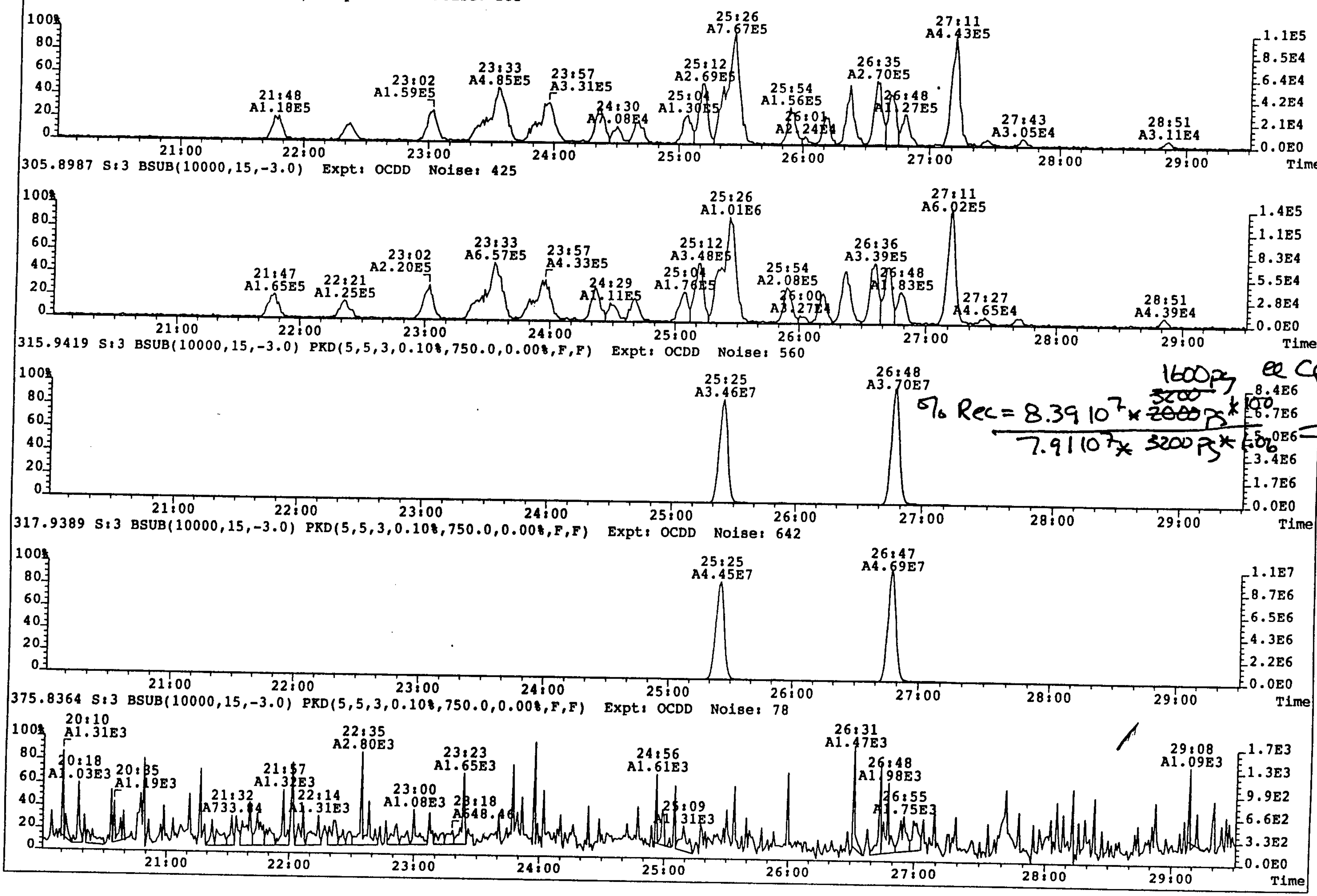

471.7750 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 184



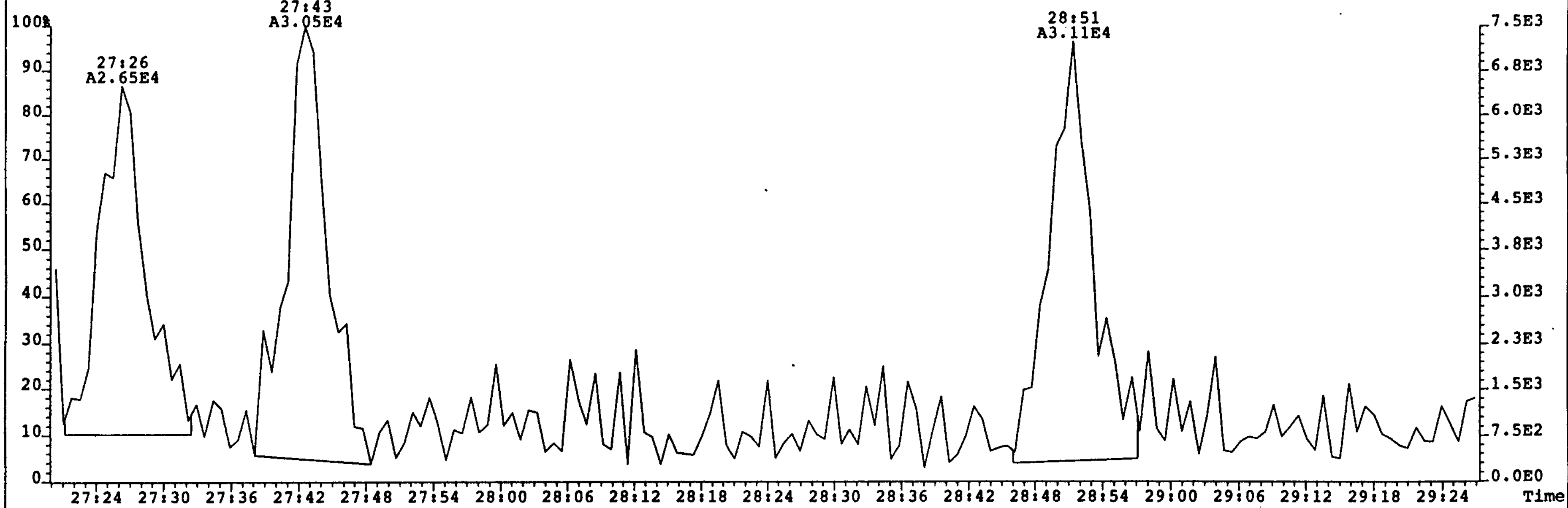

LOCK_MASS_CHECK S:3 F:5 Expt: OCDD



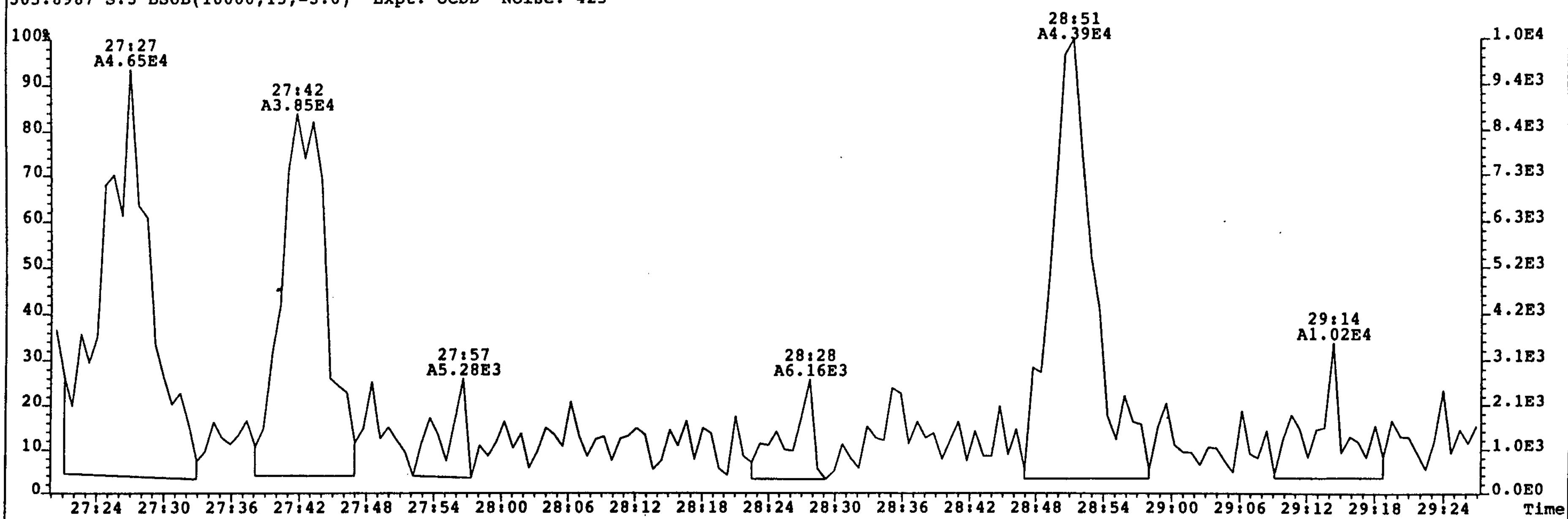
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
303.9016 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 281



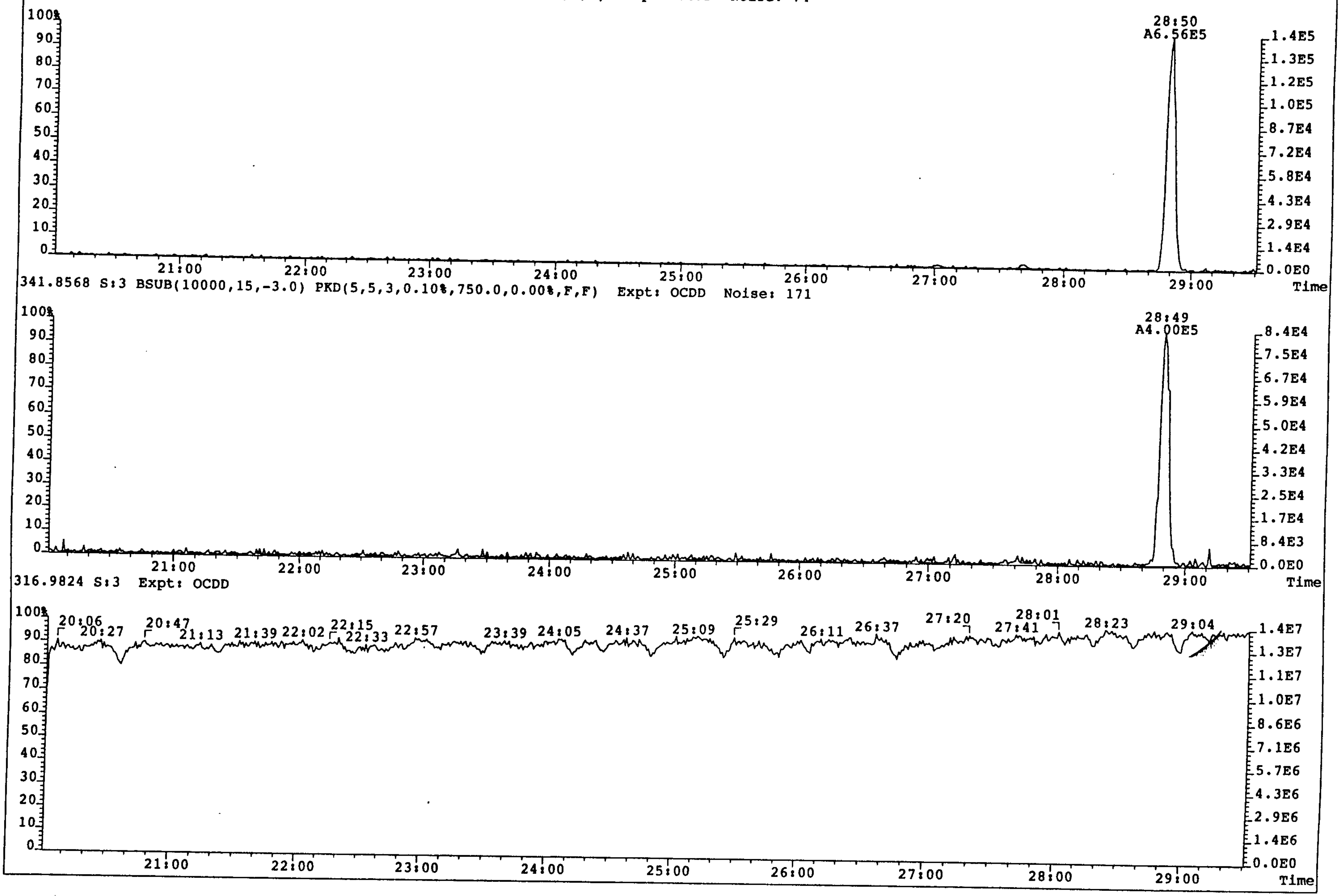
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
303.9016 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 281



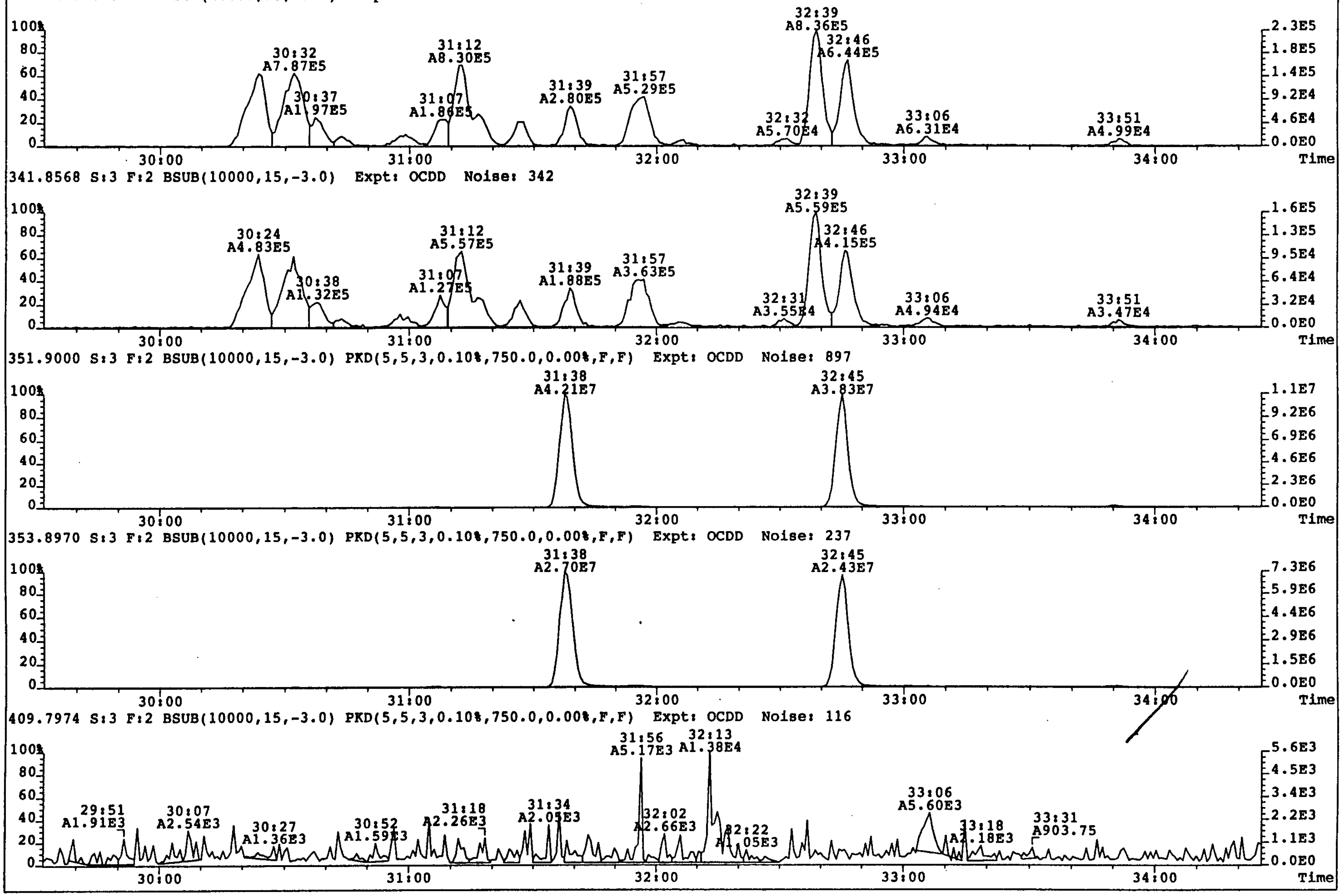

305.8987 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 425



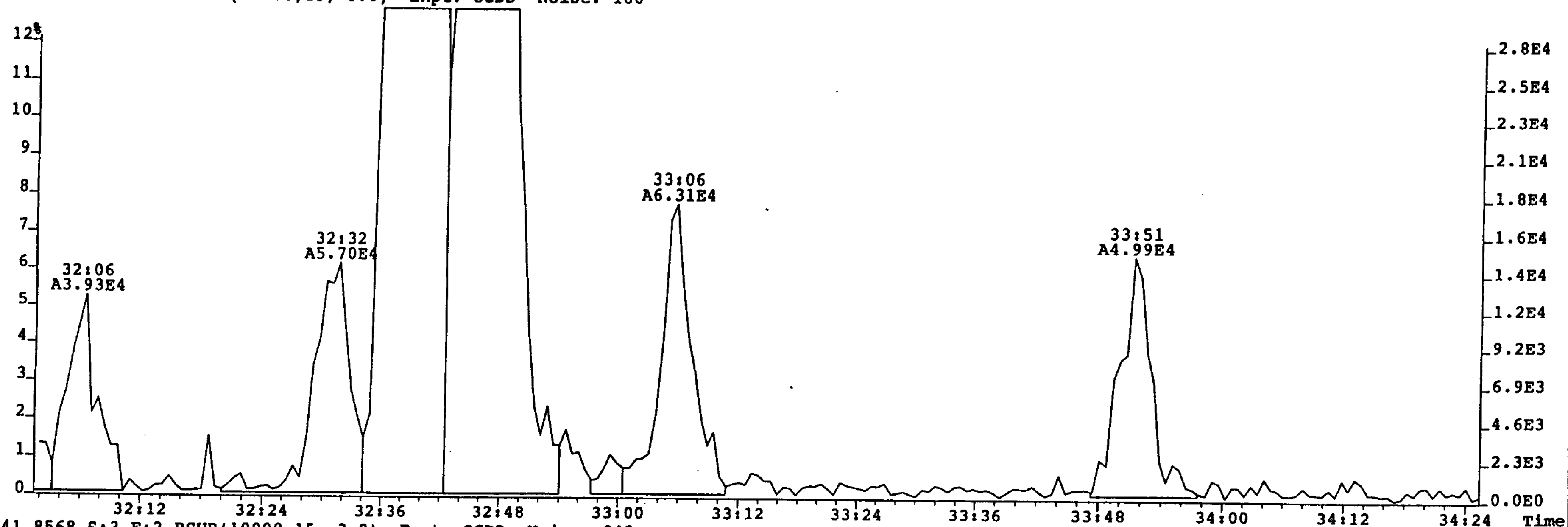
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
339.8597 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 74



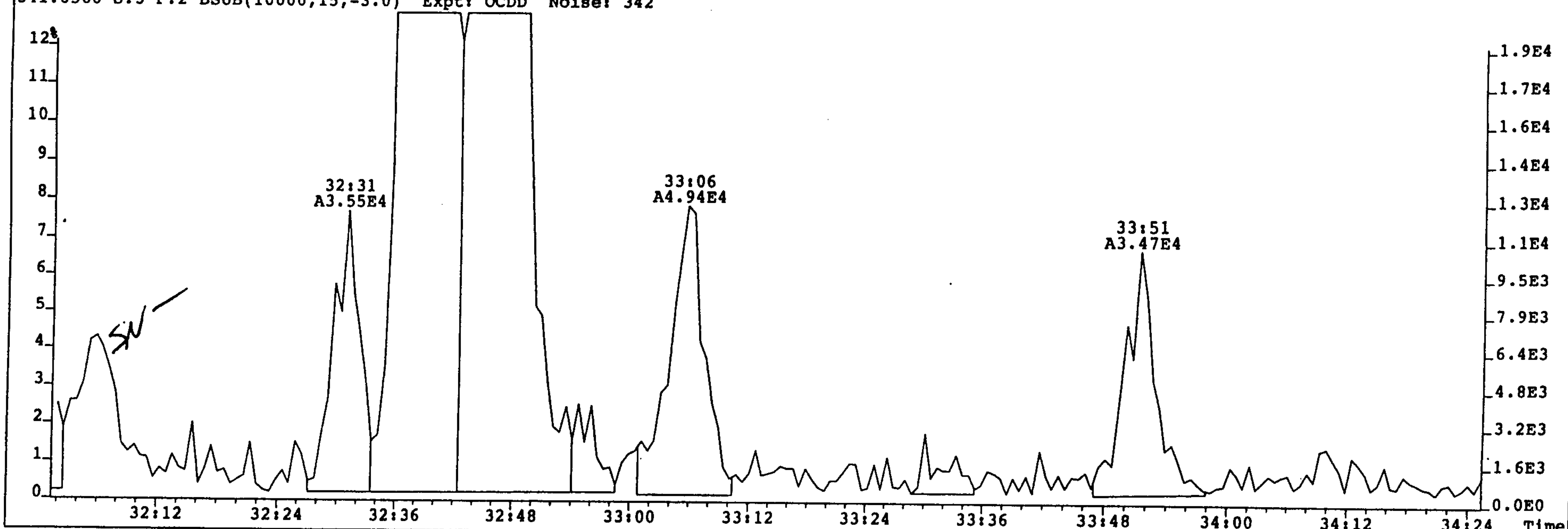
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
339.8597 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 160



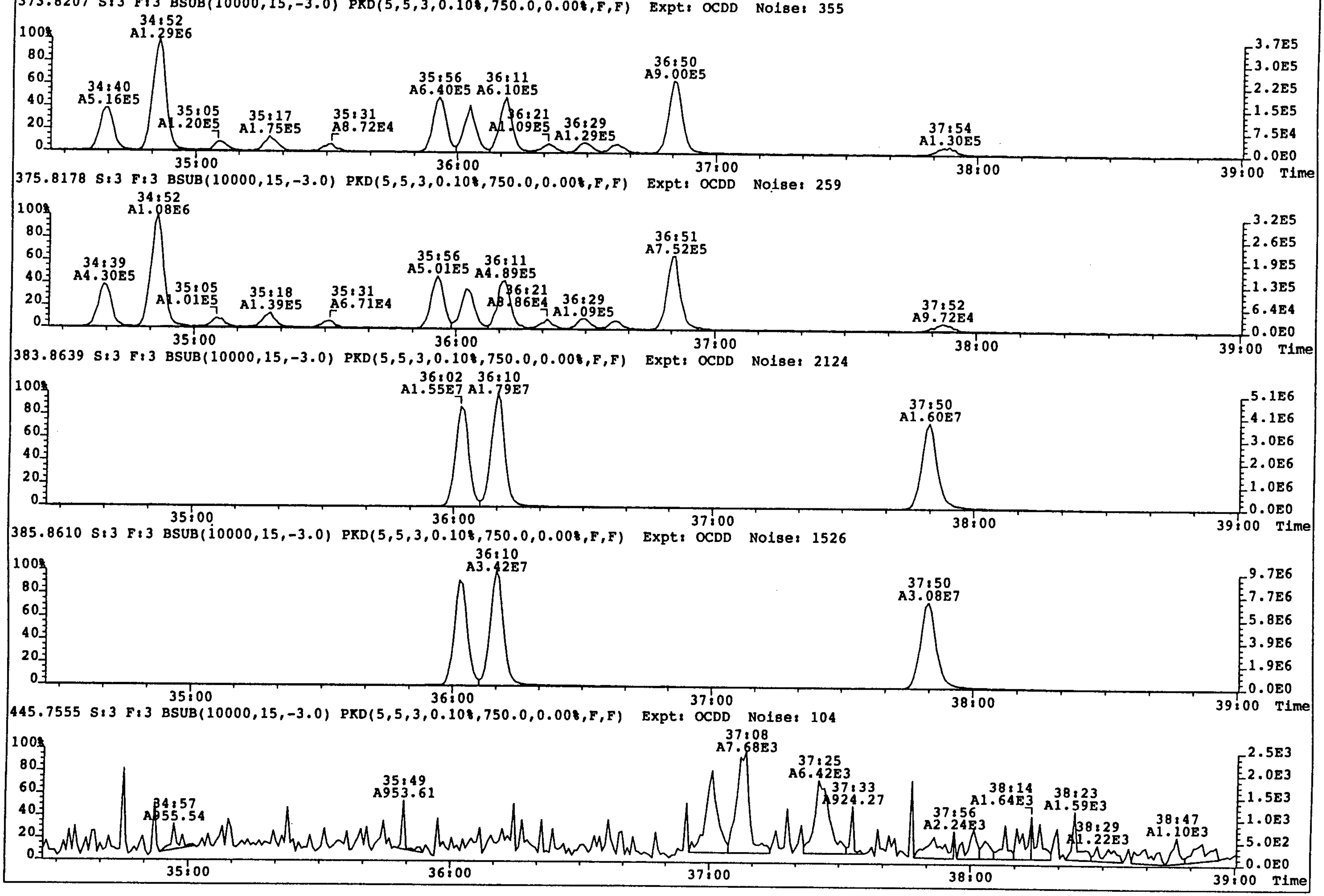
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
339.8597 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 160



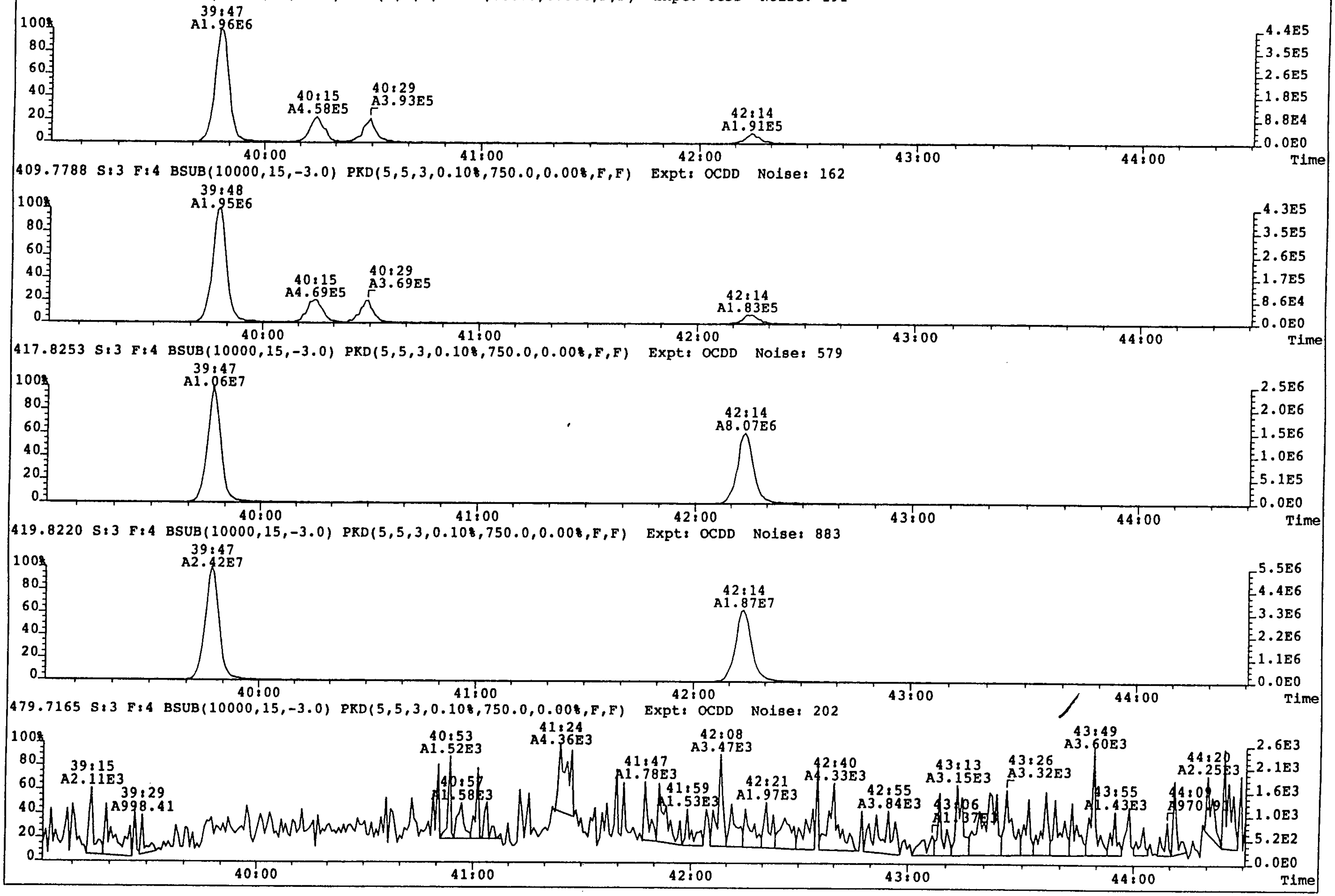

341.8568 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 342



File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5

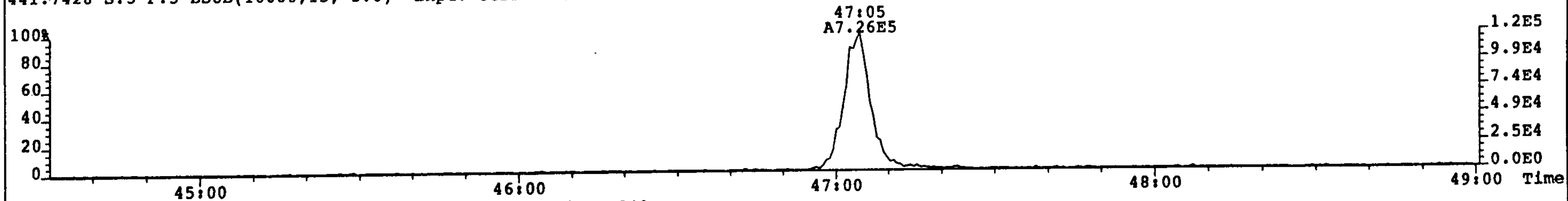


File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
407.7818 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 191

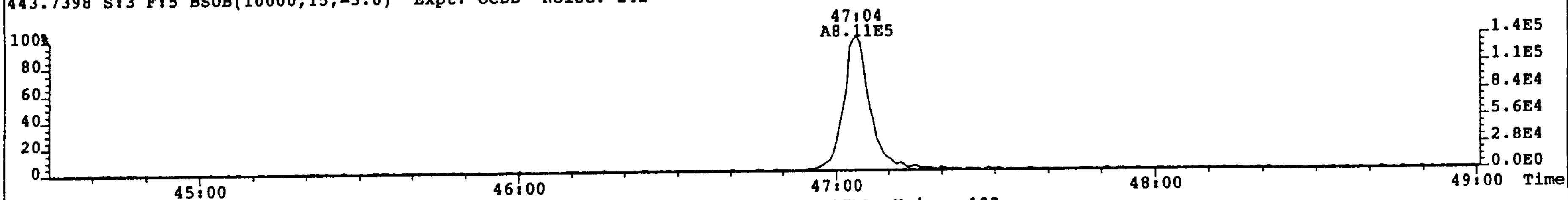


File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5

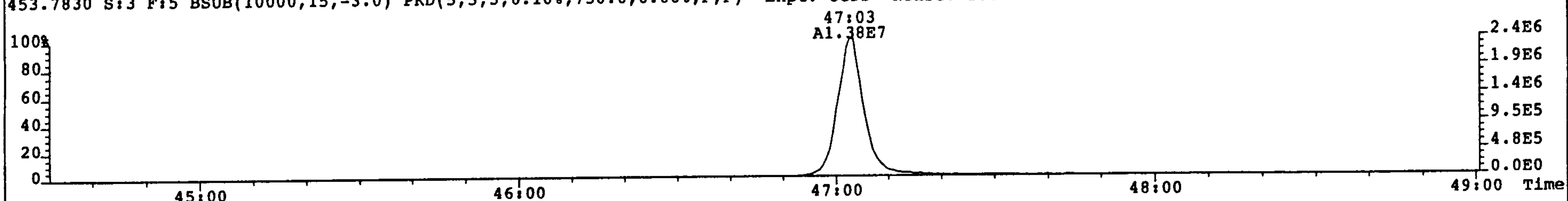
441.7428 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 146



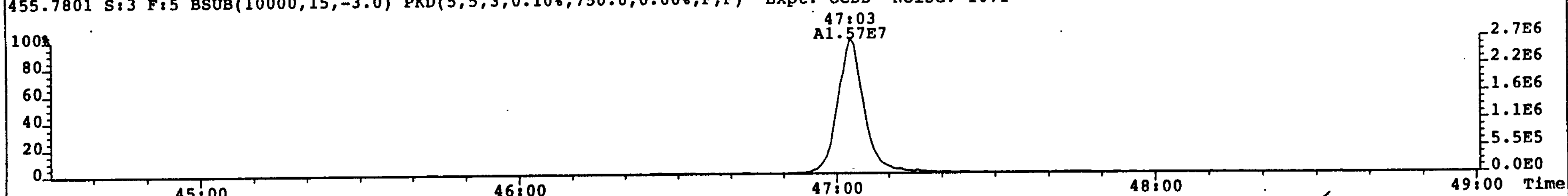

443.7398 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 242



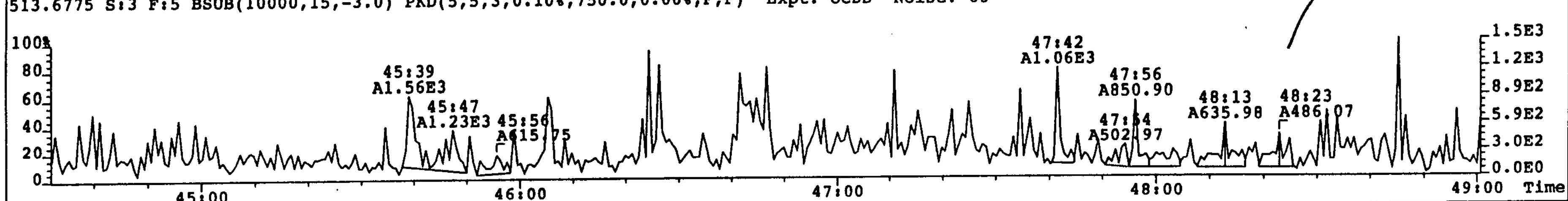

453.7830 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 102




455.7801 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1071




513.6775 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 68



# Sample ID: M23-2

## Method M23

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | PES | Matrix: | Air | Project No.: | P1388 | Date Received: | 6-Feb-01 |
| Project ID: | F181.001 | Weight/Volume: | 1 | Sample ID: | P1388_275_002 | Date Extracted: | 8-Feb-01 |
| Date Collected: | 31-Jan-01 | | | QC Batch No.: | 275 | Date Analyzed: | 14-FEB-01 |

| Analyte | Conc. | DL | EMPC | Qualifier | Recoveries | | |
|---|---|---|---|---|---|---|---|
| | pg | pg | pg | | IS | SS | AS |
| 2,3,7,8-TCDD | 0.945 | | | A B | 98 | 102 | 86.2 |
| 1,2,3,7,8-PeCDD | 2.44 | | | A | 108 | 105 | 86.2 |
| 1,2,3,4,7,8-HxCDD | EMPC | | 1.96 | A | 97.4 | 102 | 86.2 |
| 1,2,3,6,7,8-HxCDD | EMPC | | 5.04 | A | 97.4 | 102 | 86.2 |
| 1,2,3,7,8,9-HxCDD | 2.76 | | | A | 97.4 | 102 | 86.2 |
| 1,2,3,4,6,7,8-HpCDD | 21.5 | | | A B | 98.1 | 104 | 86.2 |
| OCDD | 57.1 | | | A B | 91.3 | 104 | 86.2 |
| 2,3,7,8-TCDF | 8.77 | | | A | 94 | 102 | 86.2 |
| 1,2,3,7,8-PeCDF | 15.2 | | | A | 95.4 | 105 | 86.2 |
| 2,3,4,7,8-PeCDF | 36.1 | | | A | 95.4 | 105 | 86.2 |
| 1,2,3,4,7,8-HxCDF | 40 | | | A B | 85.9 | 104 | 86.2 |
| 1,2,3,6,7,8-HxCDF | 45.7 | | | A | 85.9 | 104 | 86.2 |
| 2,3,4,6,7,8-HxCDF | 73.7 | | | | 85.9 | 104 | 86.2 |
| 1,2,3,7,8,9-HxCDF | 11.1 | | | A | 85.9 | 104 | 86.2 |
| 1,2,3,4,6,7,8-HpCDF | 208 | | | B | 85.4 | 104 | 86.2 |
| 1,2,3,4,7,8,9-HpCDF | 22.2 | | | A | 85.4 | 104 | 86.2 |
| OCDF | 118 | | | | 88.9 | 104 | 86.2 |
| **Totals & TEQs** | | | | | | | |
| TCDDs | 13 | | 15.6 | | | | |
| PeCDDs | 31.3 | | 33.9 | | | | |
| HxCDDs | 42.9 | | 49.9 | | | | |
| HpCDDs | 44.4 | | | | | | |
| TCDFs | 265 | | | | | | |
| PeCDFs | 354 | | 360 | | | | |
| HxCDFs | 441 | | | | | | |
| HpCDFs | 328 | | | | | | |
| **Total PCDD/Fs** | **1690** | | **1710** | | | | |
| **TEQ (ND=0)** | **41.9** | | **42.6** | **ITEF** | | | |
| **TEQ (ND=DL/2)** | **41.9** | | **42.6** | **ITEF** | | | |


ALTA ANALYTICAL PERSPECTIVES

2714 Exchange Drive
Wilmington
North Carolina 28405
USA

Tel: 910 794-1613
Fax: 910 794-3919
e-mail: ytondeur@cs.com
web: www.ultratrace.com


Reviewer Cl
Date 25 Feb 01

Client ID: M23-2
Lab ID: P1388_275_002

Filename: 010214P1 S: 5 Acq: 14-FEB-01 14:32:45
GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000

ConCal: 010214P1-
EndCal: 010214P1-



| | Name | Resp | RA | | RRF | RT | Conc | Qualif. | CDE | noise | Fac | DL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2,3,7,8-TCDD | 1.91e+04 | 0.25 | n | 1.26 | 27:44 | 0.903 | | | 461 | 2.5 | 0.408 | |
| | 1,2,3,7,8-PeCDD | 3.73e+04 | 1.44 | y | 1.01 | 33:11 | 2.44 | | | 589 | 2.5 | 0.925 | |
| | 1,2,3,4,7,8-HxCDD | 2.77e+04 | 1.04 | n | 1.14 | 37:06 | 1.96 | | | 1208 | 2.5 | 1.92 | |
| | 1,2,3,6,7,8-HxCDD | 6.38e+04 | 1.50 | n | 1.02 | 37:13 | 5.04 | | | 1208 | 2.5 | 2.14 | |
| | 1,2,3,7,8,9-HxCDD | 3.90e+04 | 1.07 | y | 1.14 | 37:32 | 2.76 | | | 1208 | 2.5 | 1.91 | |
| | 1,2,3,4,6,7,8-HpCDD | 2.94e+05 | 1.03 | y | 1.13 | 41:31 | 21.5 | | | 1157 | 2.5 | 2.46 | |
| | OCDD | 5.34e+05 | 0.88 | y | 1.03 | 46:51 | 57.1 | | | 970 | 2.5 | 3.72 | |
| | 2,3,7,8-TCDF | 1.86e+05 | 0.85 | y | 1.05 | 26:51 | 8.77 | | | 1198 | 2.5 | 1.08 | |
| | 1,2,3,7,8-PeCDF | 2.93e+05 | 1.45 | y | 1.04 | 31:43 | 15.2 | | | 1919 | 2.5 | 2.26 | |
| | 2,3,4,7,8-PeCDF | 7.09e+05 | 1.46 | y | 1.05 | 32:50 | 36.1 | | | 1919 | 2.5 | 2.23 | |
| | 1,2,3,4,7,8-HxCDF | 6.78e+05 | 1.20 | y | 1.13 | 36:07 | 40.0 | | | 1794 | 2.5 | 1.41 | |
| | 1,2,3,6,7,8-HxCDF | 8.49e+05 | 1.20 | y | 1.24 | 36:16 | 45.7 | | | 1794 | 2.5 | 1.29 | |
| | 2,3,4,6,7,8-HxCDF | 1.29e+06 | 1.21 | y | 1.16 | 36:55 | 73.7 | | | 1794 | 2.5 | 1.37 | |
| | 1,2,3,7,8,9-HxCDF | 1.69e+05 | 1.27 | y | 1.02 | 37:58 | 11.1 | | | 1794 | 2.5 | 1.57 | |
| | 1,2,3,4,6,7,8-HpCDF | 3.37e+06 | 1.01 | y | 1.54 | 39:53 | 208 | | | 929 | 2.5 | 1.03 | |
| | 1,2,3,4,7,8,9-HpCDF | 3.03e+05 | 1.15 | y | 1.30 | 42:20 | 22.2 | | | 929 | 2.5 | 1.22 | |
| | OCDF | 1.33e+06 | 0.84 | y | 1.15 | 47:10 | 118 | | | 1241 | 2.5 | 3.66 | |
| | | | | | | | | | | | | | EMPC |
| | Total Tetra-Dioxins | 2.55e+05 | 0.72 | y | 1.26 | 24:00 | 12.0 | | | 461 | 2.5 | 0.408 | 15.6 |
| | Total Penta-Dioxins | 4.79e+05 | 1.71 | y | 1.01 | 30:39 | 31.3 | | | 589 | 2.5 | 0.925 | 33.9 |
| | Total Hexa-Dioxins | 5.87e+05 | 1.24 | y | 1.10 | 35:23 | 42.9 | | | 1208 | 2.5 | 1.99 | 49.9 |
| | Total Hepta-Dioxins | 6.07e+05 | 1.04 | y | 1.13 | 40:19 | 44.4 | | | 1157 | 2.5 | 2.46 | 44.4 |
| | Total Tetra-Furans | 5.62e+06 | 0.67 | y | 1.05 | 21:50 | 265 | | | 1198 | 2.5 | 1.08 | 265 |
| | 1st Fnc. Penta-Furans | 7.27e+05 | 1.72 | y | 1.05 | 28:52 | 37.3 | | | 2148 | 2.5 | 2.51 | 37.3 |
| | Total Penta-Furans | 6.17e+06 | 1.38 | y | 1.05 | 30:26 | 317 | | | 1919 | 2.5 | 2.24 | |
| | PeCDF Totals: | | | | | | 354 | | | | | | 360 |
| | Total Hexa-Furans | 7.60e+06 | 1.23 | y | 1.14 | 34:44 | 441 | | | 1794 | 2.5 | 1.41 | 441 |
| | Total Hepta-Furans | 5.12e+06 | 1.01 | y | 1.42 | 39:53 | 328 | | | 929 | 2.5 | 1.12 | 328 |
| | | | | | | | | | | | | | Rec |
| IS | 13C-2,3,7,8-TCDD | 6.72e+07 | 0.80 | y | 1.13 | 27:43 | 3920 | | | | | | 98.0 |
| IS | 13C-1,2,3,7,8-PeCDD | 6.05e+07 | 1.57 | y | 0.93 | 33:11 | 4330 | | | | | | 108 |
| IS | 13C-1,2,3,6,7,8-HxCDD | 4.95e+07 | 1.25 | y | 0.93 | 37:12 | 3900 | | | | | | 97.4 |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.84e+07 | 1.04 | y | 0.91 | 41:30 | 3920 | | | | | | 98.1 |
| IS | 13C-OCDD | 3.65e+07 | 0.89 | y | 0.73 | 46:50 | 3650 | | | | | | 91.3 |
| IS | 13C-2,3,7,8-TCDF | 8.12e+07 | 0.78 | y | 1.06 | 26:49 | 3760 | | | | | | 94.0 |
| IS | 13C-1,2,3,7,8-PeCDF | 7.45e+07 | 1.57 | y | 0.96 | 31:42 | 3820 | | | | | | 95.4 |
| IS | 13C-1,2,3,6,7,8-HxCDF | 6.00e+07 | 0.51 | y | 1.28 | 36:15 | 3430 | | | | | | 85.9 |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 4.20e+07 | 0.45 | y | 0.90 | 39:52 | 3420 | | | | | | 85.4 |
| IS | 13C-OCDF | 3.93e+07 | 0.88 | y | 0.81 | 47:09 | 3560 | | | | | | 88.9 |
| RS/RT | 13C-1,2,3,4-TCDD | 6.05e+07 | 0.79 | y | 1.00 | 27:03 | 4000 | | | | | | - |
| RS | 13C-1,2,3,4-TCDF | 8.14e+07 | 0.77 | y | 1.00 | 25:27 | 4000 | | | | | | - |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD | 5.45e+07 | 1.23 | y | 1.00 | 37:31 | 4000 | | | | | | - |
| PS | 37Cl-2,3,7,8-TCDD | 3.51e+07 | | | 0.51 | 27:44 | 4060 | | | | | | 102 |
| PS | 13C-2,3,4,7,8-PeCDF | 7.61e+07 | 1.53 | y | 0.97 | 32:49 | 4200 | | | | | | 105 |
| PS | 13C-1,2,3,4,7,8-HxCDD | 4.65e+07 | 1.26 | y | 0.92 | 37:05 | 4070 | | | | | | 102 |
| PS | 13C-1,2,3,4,7,8-HxCDF | 5.67e+07 | 0.52 | y | 0.91 | 36:06 | 4150 | | | | | | 104 |
| PS | 13C-1,2,3,4,7,8,9-HpCDF | 3.75e+07 | 0.44 | y | 0.85 | 42:19 | 4180 | | | | | | 104 |
| AS | 13C-1,2,3,7,8,9-HxCDF | 5.02e+07 | 0.52 | y | 1.07 | 37:55 | 3450 | | | | | | 86.2 |

Reviewer: C
Date: 24 Feb 01

Analyst: GAG
Date: 24 Feb 01

41.

Totals class: TCDD EMPC Function: 1 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 15.595 Unnamed Conc.: 14.692

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24:00 | 2.372e+04 | y | 3.309e+04 | y | 0.72 | y | 5.681e+04 | 5.681e+04 | 1.51e+01 | y | 2.68 | |
| 24:22 | 1.610e+04 | y | 1.791e+04 | y | 0.90 | n | 3.401e+04 | 3.170e+04 | 1.21e+01 | y | 1.50 | |
| 24:48 | 1.411e+04 | y | 1.952e+04 | y | 0.72 | y | 3.363e+04 | 3.363e+04 | 8.93e+00 | y | 1.59 | |
| 25:52 | 2.873e+04 | y | 3.291e+04 | y | 0.87 | y | 6.164e+04 | 6.164e+04 | 1.25e+01 | y | 2.91 | |
| 26:04 | 1.571e+04 | y | 1.998e+04 | y | 0.79 | y | 3.569e+04 | 3.569e+04 | 1.09e+01 | y | 1.68 | |
| 26:15 | 1.258e+04 | y | 1.383e+04 | y | 0.91 | n | 2.640e+04 | 2.447e+04 | 8.11e+00 | y | 1.15 | |
| 27:26 | 2.114e+04 | y | 2.588e+04 | y | 0.82 | y | 4.702e+04 | 4.702e+04 | 1.21e+01 | y | 2.22 | |
| 27:44 | 8.330e+03 | y | 3.278e+04 | y | 0.25 | n | 4.111e+04 | 1.915e+04 | 1.80e+01 | y | 0.903 | 2,3,7,8-TCDD |
| 28:04 | 8.657e+03 | y | 1.180e+04 | y | 0.73 | y | 2.045e+04 | 2.045e+04 | 7.31e+00 | y | 0.965 | |



Totals class: PeCDD EMPC Function: 2 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 33.882 Unnamed Conc.: 31.445

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30:39 | 8.110e+04 | y | 4.749e+04 | y | 1.71 | y | 1.286e+05 | 1.286e+05 | 1.65e+01 | y | 8.39 | |
| 31:12 | 1.570e+04 | y | 1.101e+04 | y | 1.43 | y | 2.672e+04 | 2.672e+04 | 5.25e+00 | y | 1.74 | |
| 31:45 | 6.211e+04 | y | 3.768e+04 | y | 1.65 | y | 9.979e+04 | 9.979e+04 | 1.58e+01 | y | 6.51 | |
| 31:57 | 1.885e+04 | y | 1.122e+04 | y | 1.68 | y | 3.007e+04 | 3.007e+04 | 8.29e+00 | y | 1.96 | |
| 32:03 | 2.815e+04 | y | 1.773e+04 | y | 1.59 | y | 4.588e+04 | 4.588e+04 | 9.42e+00 | y | 3.00 | |
| 32:19 | 3.524e+04 | y | 2.142e+04 | y | 1.65 | y | 5.667e+04 | 5.667e+04 | 9.42e+00 | y | 3.70 | |
| 32:41 | 3.312e+04 | n | 2.132e+04 | y | 1.55 | y | 5.444e+04 | 5.444e+04 | 1.19e+01 | y | 3.55 | |
| 33:11 | 2.206e+04 | y | 1.527e+04 | y | 1.44 | y | 3.733e+04 | 3.733e+04 | 6.28e+00 | y | 2.44 | 1,2,3,7,8-PeCDD |
| 33:17 | 1.248e+04 | y | 1.007e+04 | y | 1.24 | n | 2.255e+04 | 2.053e+04 | 5.25e+00 | y | 1.34 | |
| 33:39 | 1.451e+04 | y | 7.442e+03 | y | 1.95 | n | 2.196e+04 | 1.898e+04 | 4.37e+00 | y | 1.24 | |



Totals class: HxCDD EMPC Function: 3 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 49.906 Unnamed Conc.: 40.154

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35:23 | 5.194e+04 | y | 4.180e+04 | y | 1.24 | y | 9.374e+04 | 9.374e+04 | 7.63e+00 | y | 6.87 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36:03 | 1.060e+05 | y | 7.841e+04 | y | 1.35 | y | 1.844e+05 | 1.844e+05 | 1.61e+01 | y | 13.5 | |
| 36:19 | 1.166e+05 | y | 8.288e+04 | y | 1.41 | y | 1.995e+05 | 1.995e+05 | 1.29e+01 | y | 14.6 | |
| 36:28 | 1.788e+04 | y | 1.453e+04 | y | 1.23 | y | 3.241e+04 | 3.241e+04 | 2.89e+00 | y | 2.37 | |
| 37:06 | 1.531e+04 | y | 1.477e+04 | y | 1.04 | n | 3.008e+04 | 2.766e+04 | 3.95e+00 | y | 1.96 | 1,2,3,4,7,8-HxCDD |
| 37:13 | 4.270e+04 | y | 2.849e+04 | y | 1.50 | n | 7.118e+04 | 6.381e+04 | 5.53e+00 | y | 5.04 | 1,2,3,6,7,8-HxCDD |
| 37:25 | 2.083e+04 | y | 1.718e+04 | y | 1.21 | y | 3.802e+04 | 3.802e+04 | 3.71e+00 | y | 2.79 | |
| 37:32 | 2.016e+04 | y | 1.888e+04 | y | 1.07 | y | 3.904e+04 | 3.904e+04 | 3.63e+00 | y | 2.76 | 1,2,3,7,8,9-HxCDD |

Page 8 of 18

Totals class: HpCDD EMPC Function: 4 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 44.412 Unnamed Conc.: 22.863

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40:19 | 1.595e+05 | n | 1.529e+05 | n | 1.04 | y | 3.124e+05 | 3.124e+05 | 2.93e+01 | y | 22.9 | |
| 41:31 | 1.492e+05 | n | 1.452e+05 | n | 1.03 | y | 2.944e+05 | 2.944e+05 | 2.29e+01 | y | 21.5 | 1,2,3,4,6,7,8-HpCDD |

Page 10 of 18

Totals class: TCDF EMPC Function: 1 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 264.52 Unnamed Conc.: 255.748

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21:50 | 6.158e+04 | n | 9.160e+04 | n | 0.67 | y | 1.532e+05 | 1.532e+05 | 1.38e+01 | y | 7.21 | |
| 22:24 | 4.874e+04 | y | 7.249e+04 | y | 0.67 | y | 1.212e+05 | 1.212e+05 | 1.12e+01 | y | 5.71 | |
| 23:04 | 7.674e+04 | n | 1.073e+05 | n | 0.72 | y | 1.840e+05 | 1.840e+05 | 1.58e+01 | y | 8.66 | |
| 23:33 | 2.671e+05 | y | 3.706e+05 | n | 0.72 | y | 6.377e+05 | 6.377e+05 | 3.29e+01 | y | 30.0 | |
| 23:58 | 1.743e+05 | y | 2.571e+05 | y | 0.68 | y | 4.315e+05 | 4.315e+05 | 2.30e+01 | y | 20.3 | |
| 24:24 | 8.418e+04 | y | 1.229e+05 | y | 0.68 | y | 2.071e+05 | 2.071e+05 | 1.89e+01 | y | 9.75 | |
| 24:32 | 5.088e+04 | y | 6.493e+04 | y | 0.78 | y | 1.158e+05 | 1.158e+05 | 1.37e+01 | y | 5.45 | |
| 24:42 | 5.749e+04 | y | 8.109e+04 | y | 0.71 | y | 1.386e+05 | 1.386e+05 | 1.41e+01 | y | 6.52 | |
| 25:05 | 6.451e+04 | y | 9.819e+04 | y | 0.66 | y | 1.627e+05 | 1.627e+05 | 1.50e+01 | y | 7.66 | |
| 25:13 | 1.388e+05 | y | 1.893e+05 | y | 0.73 | y | 3.281e+05 | 3.281e+05 | 3.52e+01 | y | 15.4 | |
| 25:22 | 1.202e+05 | y | 1.676e+05 | y | 0.72 | y | 2.878e+05 | 2.878e+05 | 3.22e+01 | y | 13.5 | |
| 25:29 | 2.469e+05 | y | 3.325e+05 | y | 0.74 | y | 5.794e+05 | 5.794e+05 | 5.50e+01 | y | 27.3 | |
| 25:56 | 8.901e+04 | y | 1.221e+05 | y | 0.73 | y | 2.111e+05 | 2.111e+05 | 2.06e+01 | y | 9.94 | |
| 26:03 | 1.704e+04 | n | 2.516e+04 | y | 0.68 | y | 4.220e+04 | 4.220e+04 | 4.70e+00 | y | 1.99 | |
| 26:13 | 6.814e+04 | y | 9.639e+04 | y | 0.71 | y | 1.645e+05 | 1.645e+05 | 2.11e+01 | y | 7.75 | |
| 26:25 | 1.262e+05 | n | 1.834e+05 | n | 0.69 | y | 3.096e+05 | 3.096e+05 | 3.39e+01 | y | 14.6 | |
| 26:38 | 1.424e+05 | y | 2.081e+05 | y | 0.68 | y | 3.505e+05 | 3.505e+05 | 4.02e+01 | y | 16.5 | |
| 26:44 | 1.099e+05 | y | 1.539e+05 | y | 0.71 | y | 2.638e+05 | 2.638e+05 | 3.10e+01 | y | 12.4 | |
| 26:51 | 8.564e+04 | y | 1.007e+05 | y | 0.85 | y | 1.863e+05 | 1.863e+05 | 2.34e+01 | y | 8.77 | 2,3,7,8-TCDF |
| 27:14 | 2.906e+05 | n | 3.718e+05 | n | 0.78 | y | 6.624e+05 | 6.624e+05 | 6.59e+01 | y | 31.2 | |
| 27:28 | 1.740e+04 | y | 2.214e+04 | y | 0.79 | y | 3.954e+04 | 3.954e+04 | 4.21e+00 | y | 1.86 | |
| 27:45 | 1.698e+04 | n | 2.467e+04 | y | 0.69 | y | 4.165e+04 | 4.165e+04 | 5.28e+00 | y | 1.96 | |

Totals class: 1st Fnc.PeCDF EMPC Function: 1 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 37.331 Unnamed Conc.: 37.331

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28:52 | 4.599e+05 | n | 2.671e+05 | n | 1.72 | y | 7.270e+05 | 7.270e+05 | 2.82e+01 | y | 37.3 | |



Totals class: PeCDF EMPC Function: 2 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 322.27 Unnamed Conc.: 270.944

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30:26 | 4.953e+05 | y | 3.587e+05 | y | 1.38 | y | 8.540e+05 | 8.540e+05 | 3.62e+01 | y | 43.9 | |
| 30:35 | 5.362e+05 | y | 3.622e+05 | y | 1.48 | y | 8.984e+05 | 8.984e+05 | 3.44e+01 | y | 46.1 | |
| 30:41 | 1.425e+05 | y | 9.719e+04 | y | 1.47 | y | 2.396e+05 | 2.396e+05 | 1.44e+01 | y | 12.3 | |
| 30:47 | 4.254e+04 | y | 3.028e+04 | y | 1.40 | y | 7.282e+04 | 7.282e+04 | 4.58e+00 | y | 3.74 | |
| 31:02 | 7.632e+04 | y | 5.606e+04 | y | 1.36 | y | 1.324e+05 | 1.324e+05 | 5.91e+00 | y | 6.80 | |
| 31:10 | 9.352e+04 | y | 6.412e+04 | y | 1.46 | y | 1.576e+05 | 1.576e+05 | 1.20e+01 | y | 8.10 | |
| 31:17 | 5.377e+05 | y | 3.760e+05 | y | 1.43 | y | 9.137e+05 | 9.137e+05 | 3.56e+01 | y | 46.9 | |
| 31:30 | 1.096e+05 | n | 7.756e+04 | y | 1.41 | y | 1.871e+05 | 1.871e+05 | 1.12e+01 | y | 9.61 | |
| 31:43 | 1.734e+05 | n | 1.199e+05 | n | 1.45 | y | 2.933e+05 | 2.933e+05 | 1.94e+01 | y | 15.2 | 1,2,3,7,8-PeCDF |
| 32:00 | 3.377e+05 | y | 2.250e+05 | n | 1.50 | y | 5.627e+05 | 5.627e+05 | 2.04e+01 | y | 28.9 | |
| 32:10 | 2.931e+04 | y | 2.298e+04 | y | 1.28 | n | 5.229e+04 | 4.822e+04 | 2.86e+00 | y | 2.48 | |
| 32:35 | 3.694e+04 | y | 3.073e+04 | y | 1.20 | n | 6.766e+04 | 6.077e+04 | 5.14e+00 | y | 3.12 | |
| 32:43 | 6.357e+05 | y | 4.118e+05 | y | 1.54 | y | 1.048e+06 | 1.048e+06 | 5.95e+01 | y | 53.8 | |
| 32:50 | 4.216e+05 | y | 2.878e+05 | y | 1.46 | y | 7.094e+05 | 7.094e+05 | 3.66e+01 | y | 36.1 | 2,3,4,7,8-PeCDF |
| 33:10 | 3.625e+04 | y | 2.600e+04 | y | 1.39 | y | 6.225e+04 | 6.225e+04 | 3.70e+00 | y | 3.20 | |
| 33:56 | 2.364e+04 | y | 1.551e+04 | y | 1.52 | y | 3.915e+04 | 3.915e+04 | 2.80e+00 | y | 2.01 | |



Totals class: HxCDF EMPC Function: 3 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 440.85 Unnamed Conc.: 270.352

| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 34:44 | 3.916e+05 | n | 3.188e+05 | n | 1.23 | y | 7.104e+05 | 7.104e+05 | 5.37e+01 | y | 41.6 | |
| 34:56 | 1.075e+06 | n | 8.895e+05 | n | 1.21 | y | 1.965e+06 | 1.965e+06 | 1.39e+02 | y | 115 | |
| 35:10 | 9.354e+04 | n | 7.599e+04 | n | 1.23 | y | 1.695e+05 | 1.695e+05 | 1.07e+01 | y | 9.93 | |
| 35:22 | 1.351e+05 | n | 1.158e+05 | n | 1.17 | y | 2.509e+05 | 2.509e+05 | 1.76e+01 | y | 14.7 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35:35 | 7.291e+04 | n | 5.418e+04 | n | 1.35 | y | 1.271e+05 | 1.271e+05 | 9.47e+00 | y | 7.45 | |
| 36:00 | 4.950e+05 | n | 4.046e+05 | n | 1.22 | y | 8.996e+05 | 8.996e+05 | 6.53e+01 | y | 52.7 | |
| 36:07 | 3.707e+05 | n | 3.076e+05 | n | 1.20 | y | 6.783e+05 | 6.783e+05 | 4.77e+01 | y | 40.0 | 1,2,3,4,7,8-HxCDF |
| 36:16 | 4.629e+05 | n | 3.859e+05 | n | 1.20 | y | 8.488e+05 | 8.488e+05 | 6.45e+01 | y | 45.7 | 1,2,3,6,7,8-HxCDF |
| 36:25 | 7.853e+04 | n | 6.828e+04 | n | 1.15 | y | 1.468e+05 | 1.468e+05 | 9.54e+00 | y | 8.60 | |
| 36:34 | 9.969e+04 | n | 8.190e+04 | n | 1.22 | y | 1.816e+05 | 1.816e+05 | 1.29e+01 | y | 10.6 | |
| 36:42 | 8.692e+04 | n | 7.646e+04 | n | 1.14 | y | 1.634e+05 | 1.634e+05 | 1.23e+01 | y | 9.57 | |
| 36:55 | 7.060e+05 | n | 5.812e+05 | n | 1.21 | y | 1.287e+06 | 1.287e+06 | 8.62e+01 | y | 73.7 | 2,3,4,6,7,8-HxCDF |
| 37:58 | 9.479e+04 | n | 7.466e+04 | n | 1.27 | y | 1.695e+05 | 1.695e+05 | 8.15e+00 | y | 11.1 | 1,2,3,7,8,9-HxCDF |

Page 18 of 18

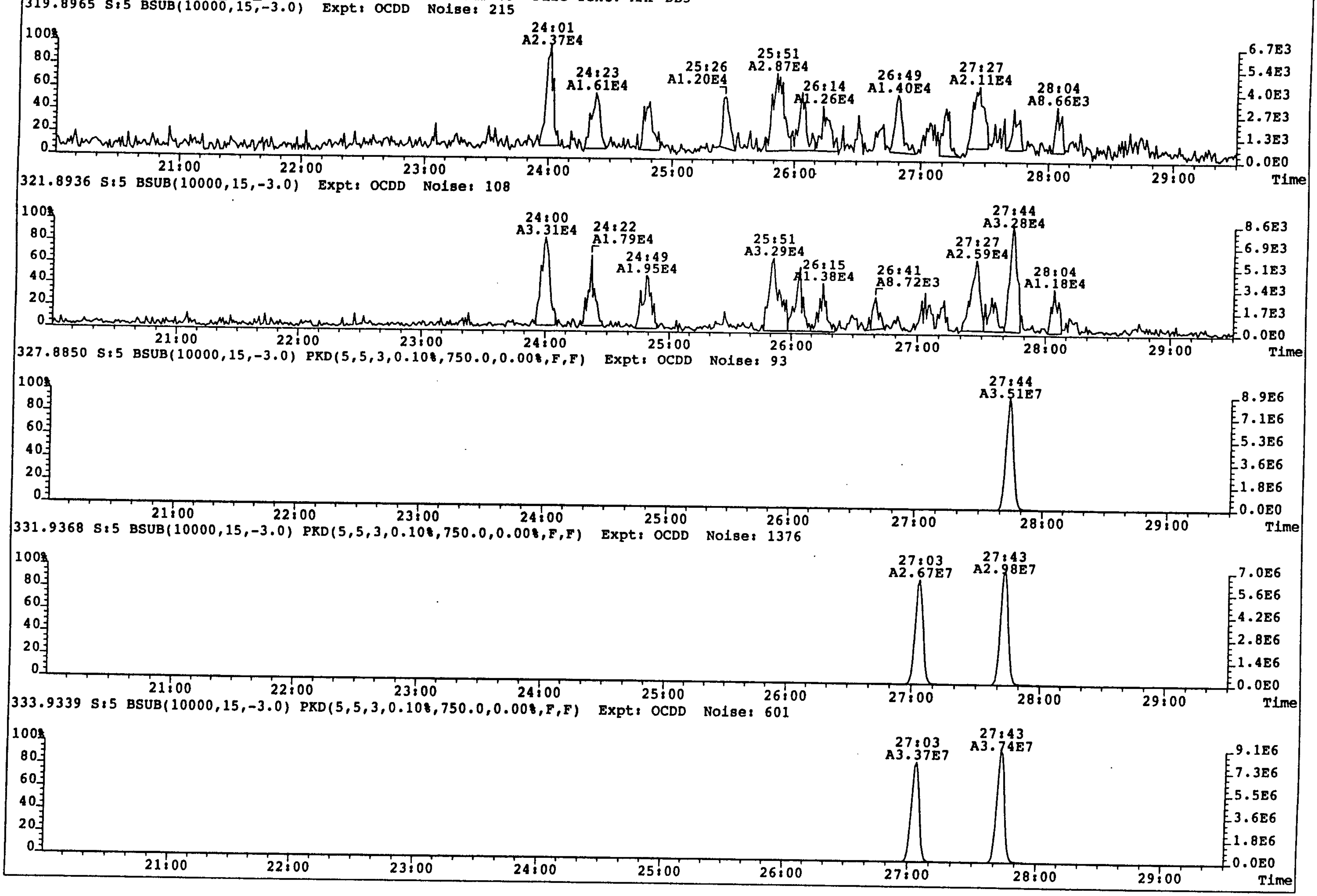
Totals class: HpCDF EMPC Function: 4 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

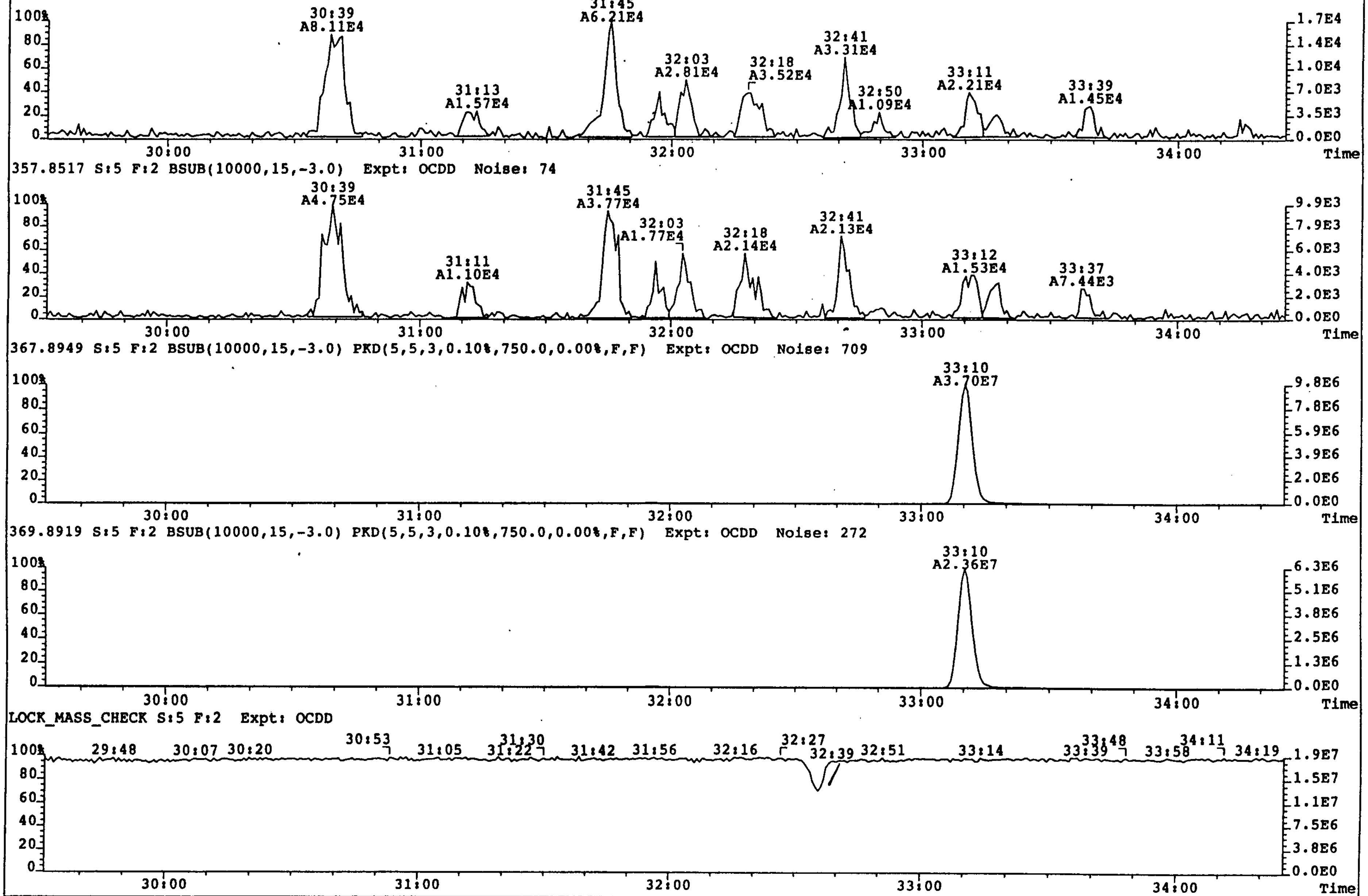
Total Conc.: 327.58 Unnamed Conc.: 96.887

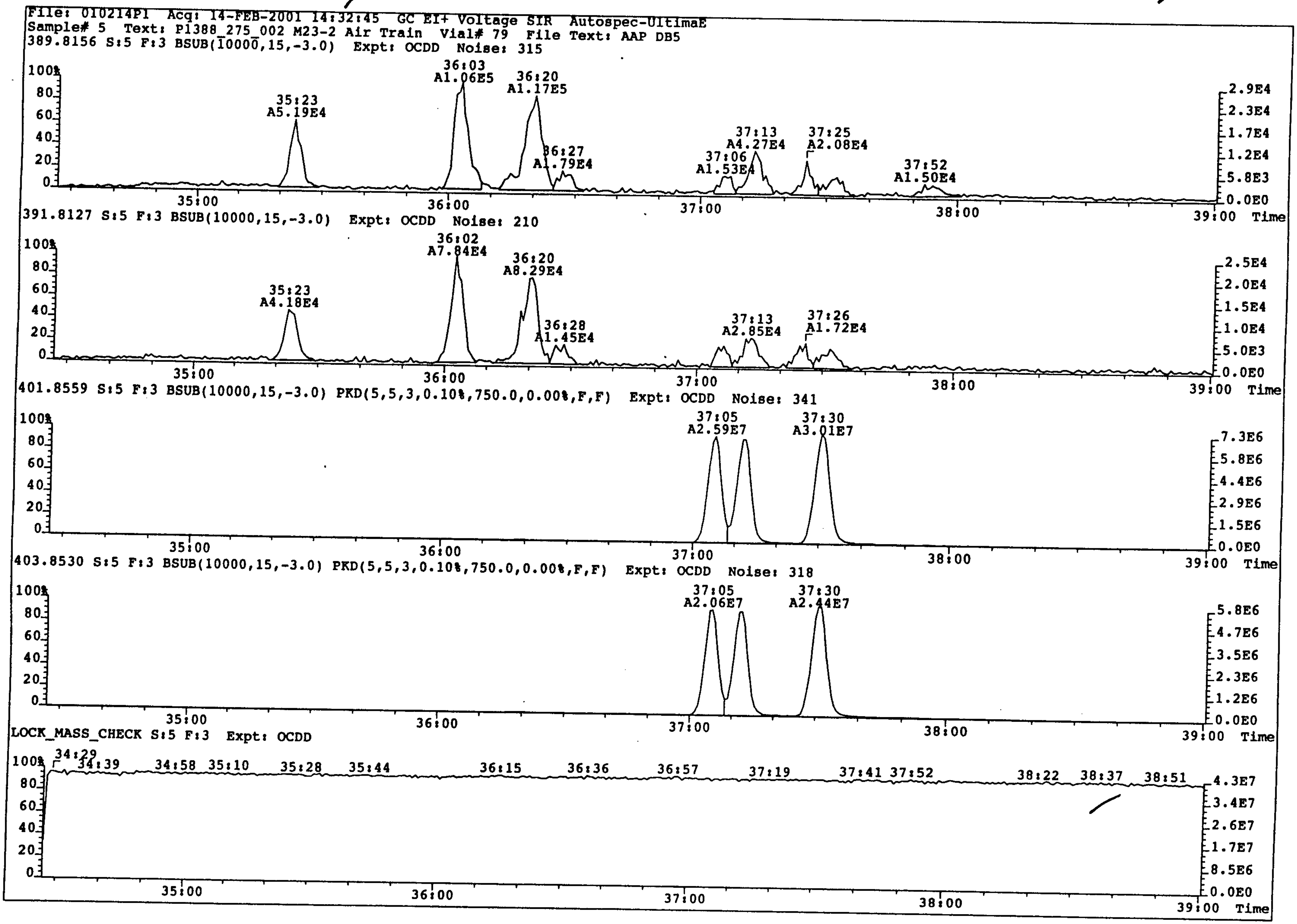
| RT | m1 Resp | mod. | m2 Resp | mod. | RA | | Resp | Adj_Resp | S/N | | Conc. | Name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39:53 | 1.698e+06 | n | 1.677e+06 | n | 1.01 | y | 3.375e+06 | 3.375e+06 | 3.76e+02 | y | 208 | 1,2,3,4,6,7,8-HpCDF |
| 40:19 | 3.964e+05 | n | 4.117e+05 | n | 0.96 | y | 8.081e+05 | 8.081e+05 | 8.62e+01 | y | 54.2 | |
| 40:34 | 3.310e+05 | n | 3.057e+05 | n | 1.08 | y | 6.367e+05 | 6.367e+05 | 6.70e+01 | y | 42.7 | |
| 42:20 | 1.617e+05 | n | 1.412e+05 | n | 1.15 | y | 3.029e+05 | 3.029e+05 | 3.08e+01 | y | 22.2 | 1,2,3,4,7,8,9-HpCDF |

File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5

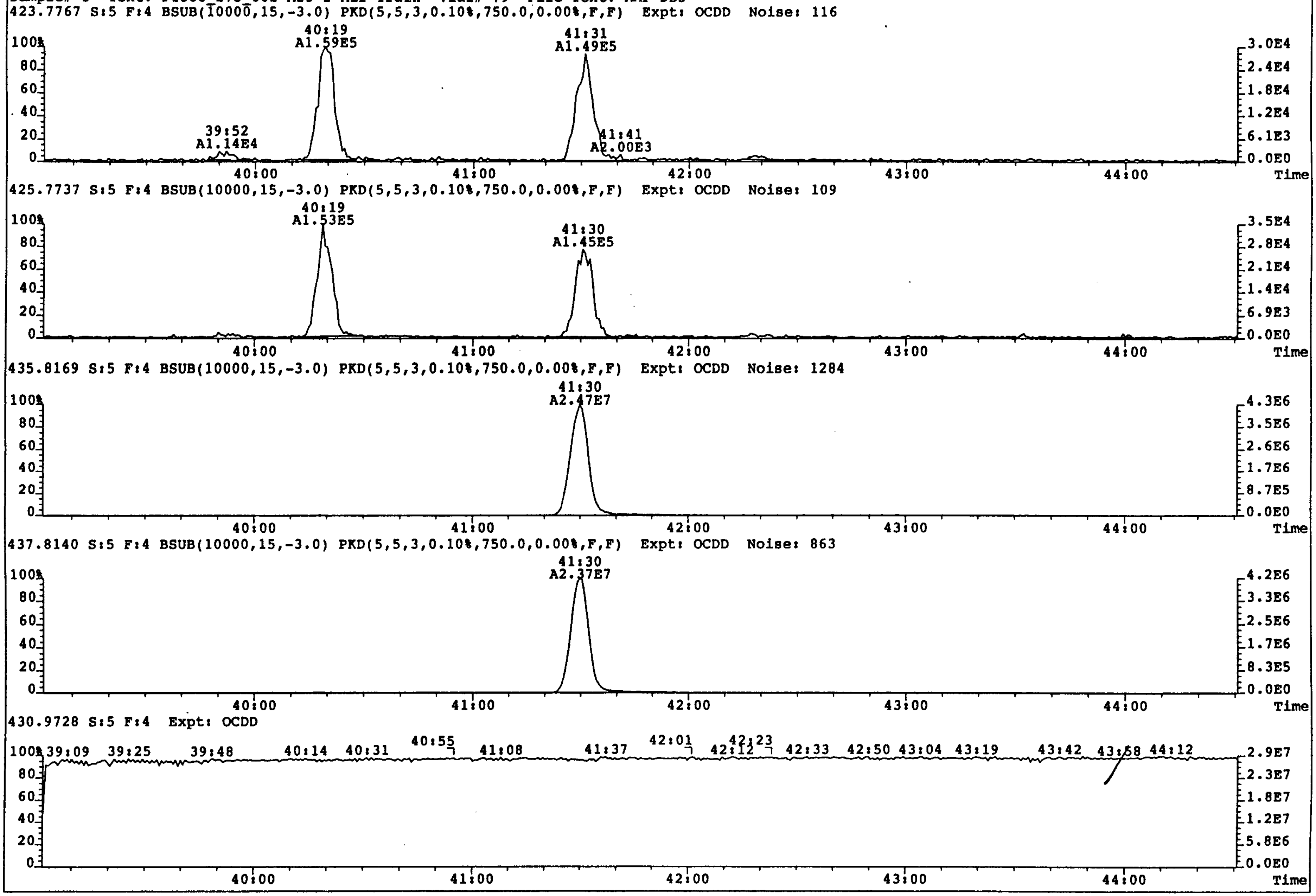


File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
355.8546 S:5 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 170

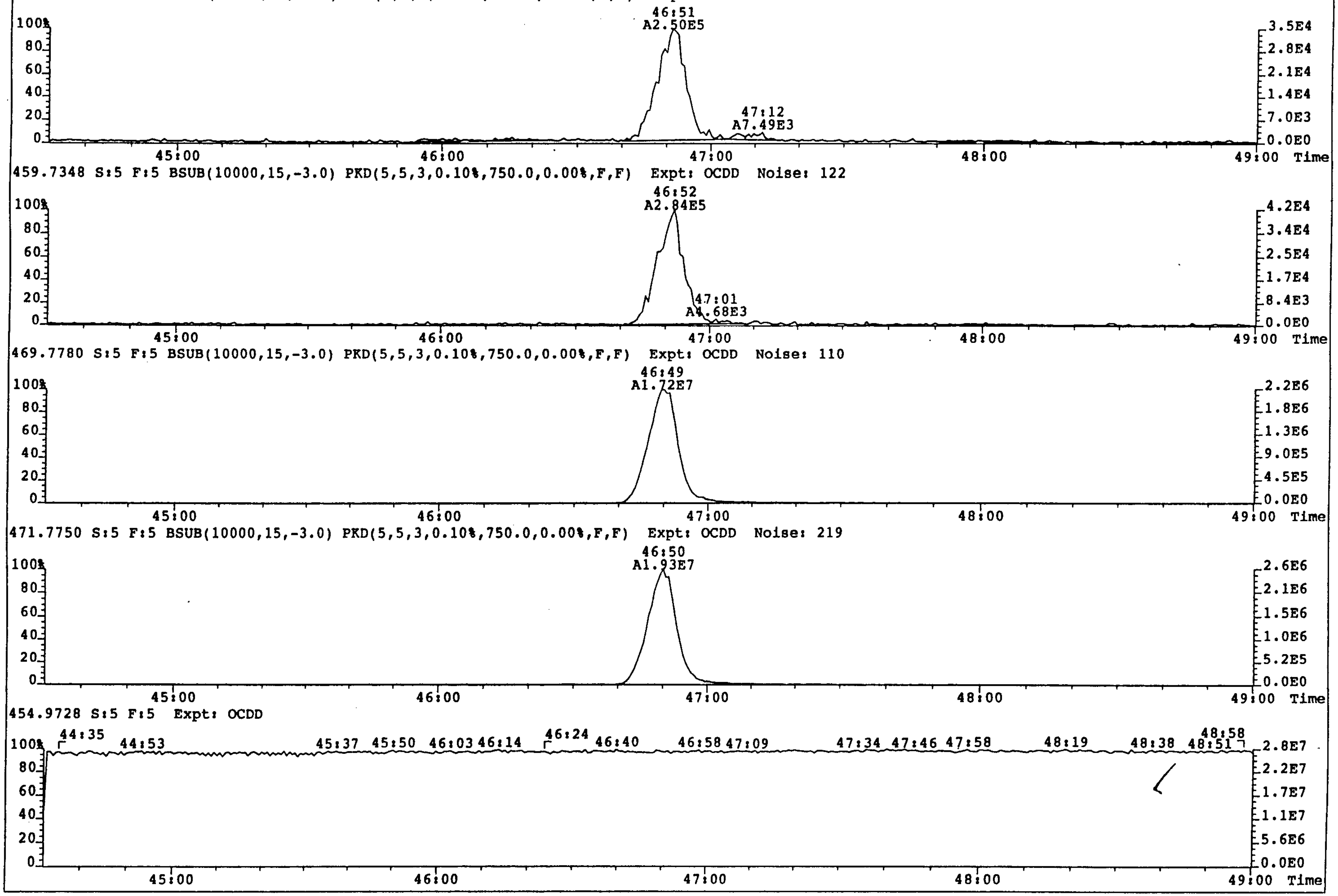


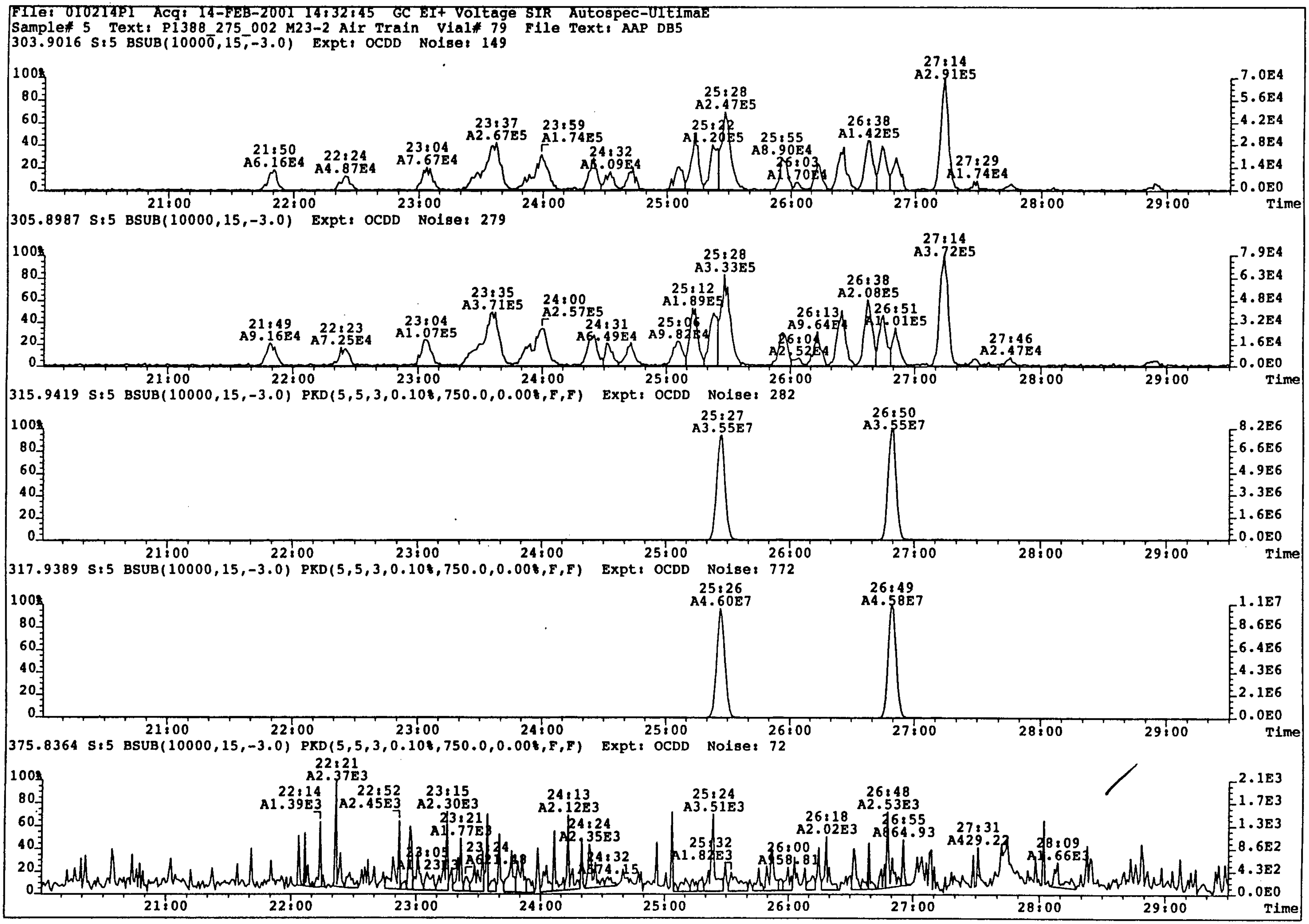

File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
389.8156 S:5 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 315
35:23 A5.19E4
36:03 A1.06E5
36:20 A1.17E5
36:27 A1.79E4
37:06 A1.53E4
37:13 A4.27E4
37:25 A2.08E4
37:52 A1.50E4
391.8127 S:5 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 210
35:23 A4.18E4
36:02 A7.84E4
36:20 A8.29E4
36:28 A1.45E4
37:13 A2.85E4
37:26 A1.72E4
401.8559 S:5 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 341
37:05 A2.59E7
37:30 A3.01E7
403.8530 S:5 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 318
37:05 A2.06E7
37:30 A2.44E7
LOCK_MASS_CHECK S:5 F:3 Expt: OCDD
34:29 34:39 34:58 35:10 35:28 35:44 36:15 36:36 36:57 37:19 37:41 37:52 38:22 38:37 38:51
Time

File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5

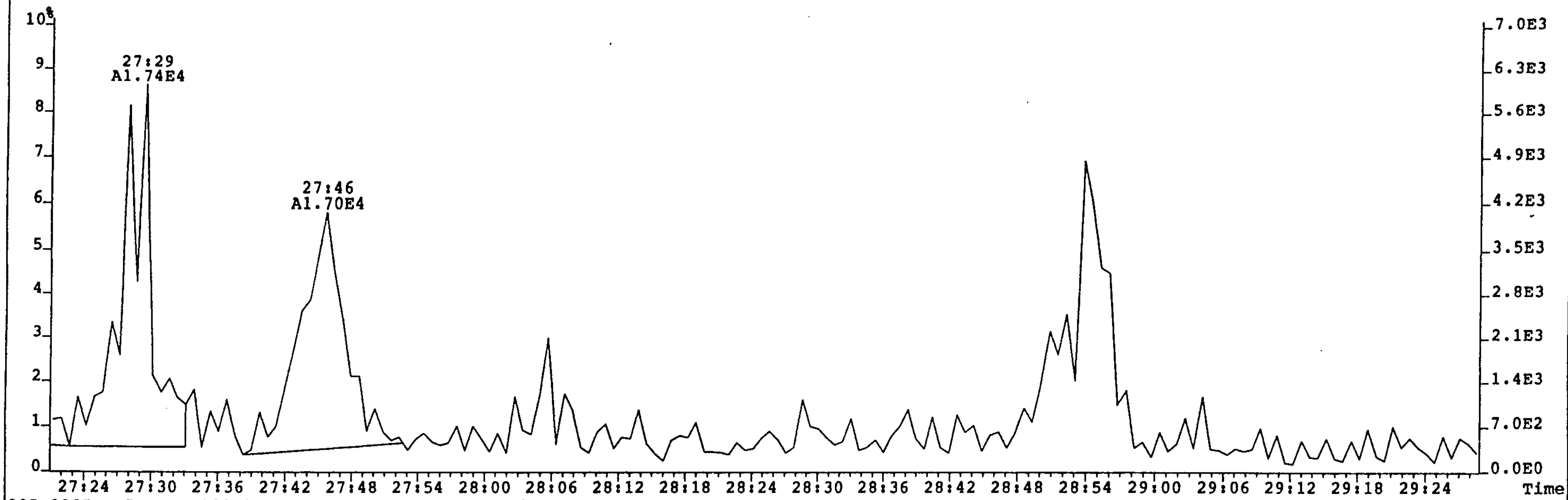


File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
457.7377 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 212

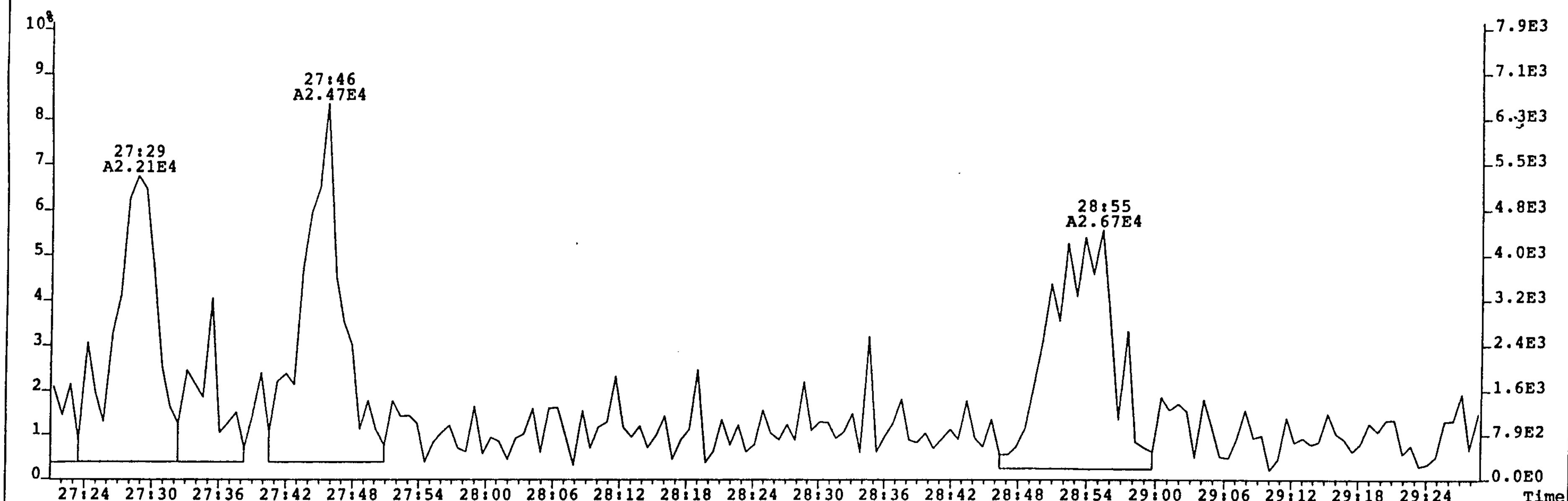



File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
303.9016 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 149
21:50 A6.16E4
22:24 A4.87E4
23:04 A7.67E4
23:37 A2.67E5
23:59 A1.74E5
25:28 A2.47E5
25:55 A8.90E4
26:38 A1.42E5
27:14 A2.91E5
27:29 A1.74E4
305.8987 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 279
21:49 A9.16E4
22:23 A7.25E4
23:04 A1.07E5
23:35 A3.71E5
24:00 A2.57E5
25:12 A1.89E5
25:28 A3.33E5
26:38 A2.08E5
27:14 A3.72E5
27:46 A2.47E4
315.9419 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 282
25:27 A3.55E7
26:50 A3.55E7
317.9389 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 772
25:26 A4.60E7
26:49 A4.58E7
375.8364 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 72
22:14 A1.39E3
22:21 A2.37E3
22:52 A2.45E3
23:15 A2.30E3
24:13 A2.12E3
25:24 A3.51E3
26:18 A2.02E3
26:48 A2.53E3
27:31 A429.22
Time

File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
303.9016 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 149



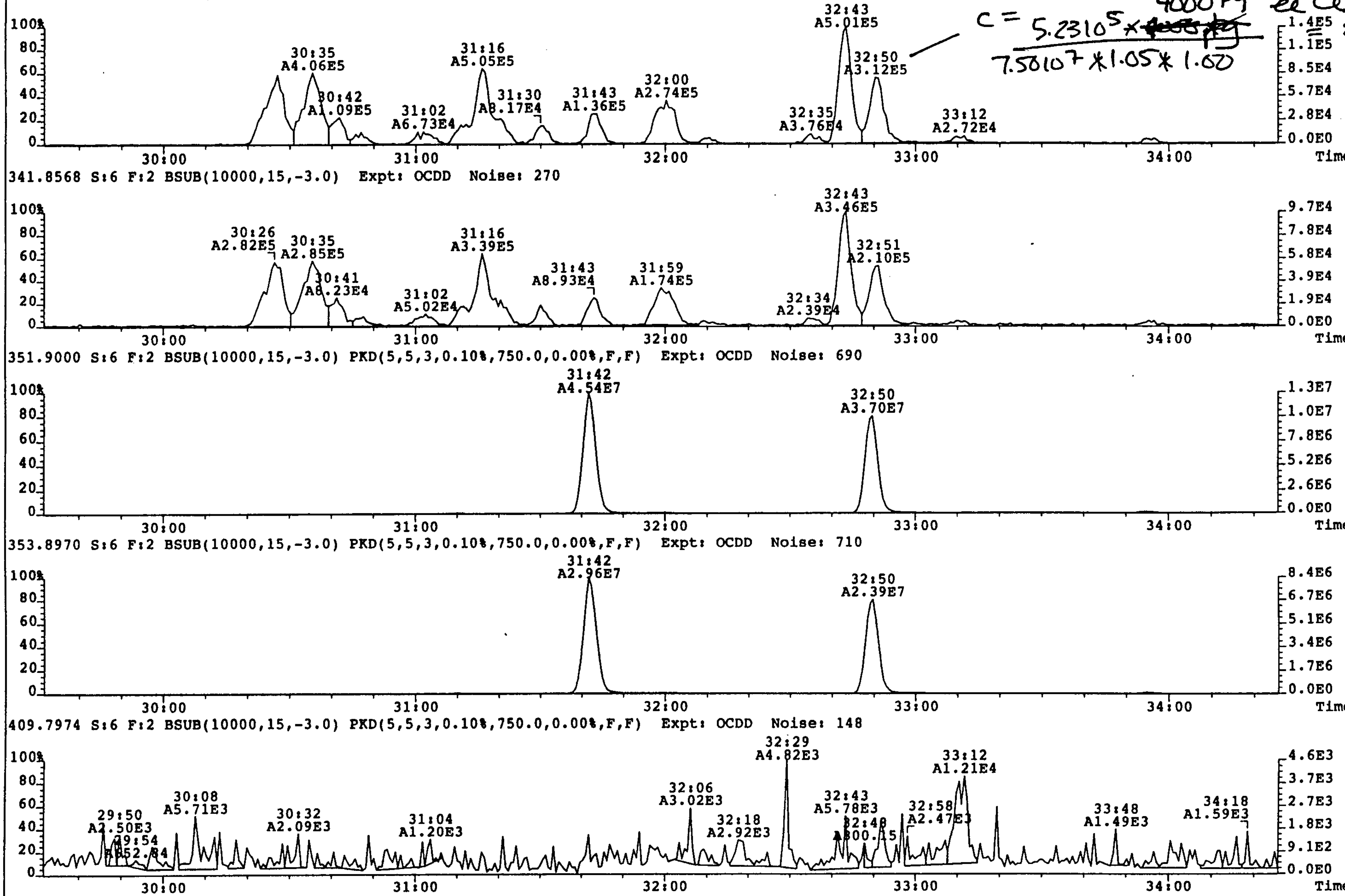

305.8987 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 279

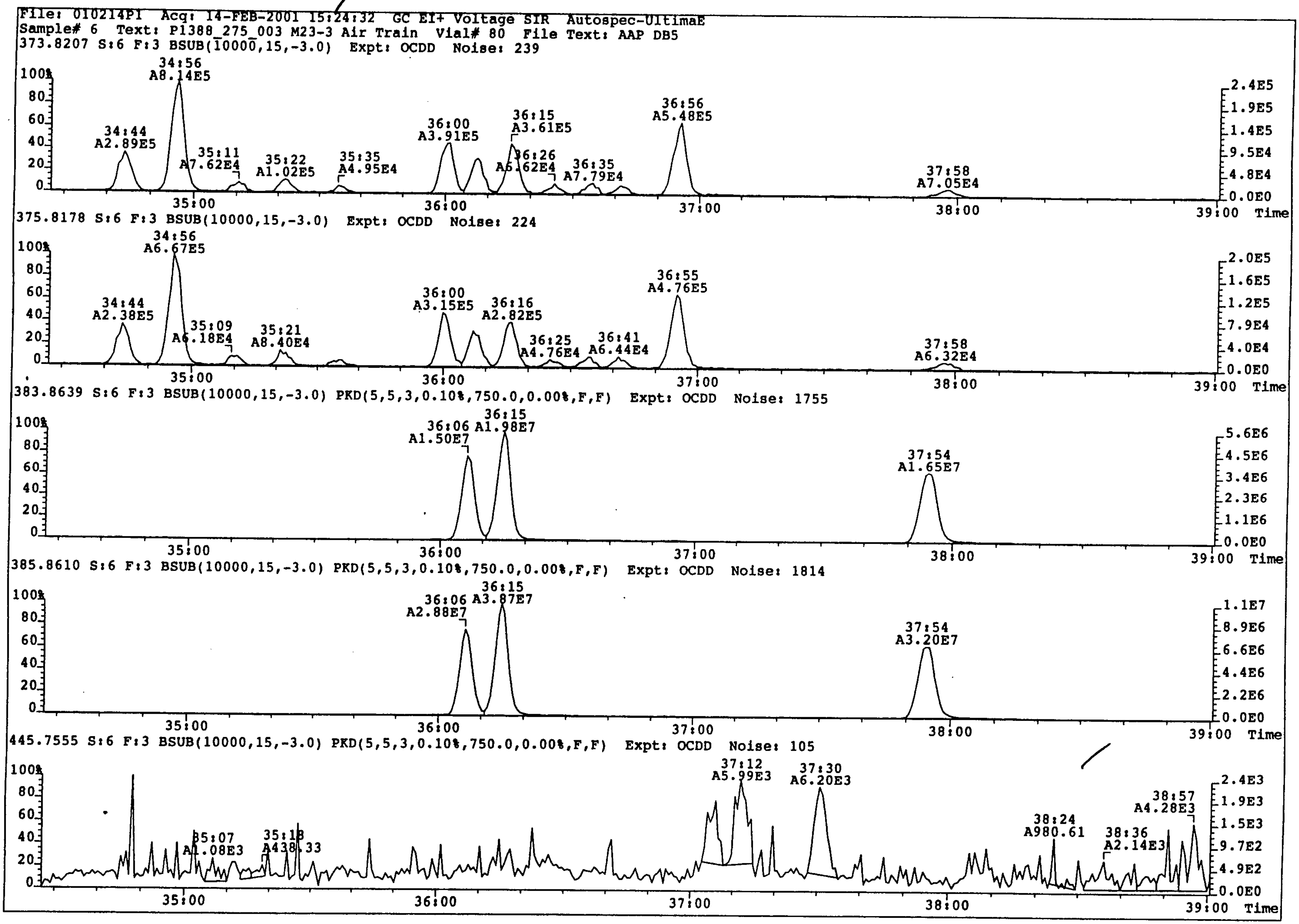


File: 010214P1 Acq: 14-FEB-2001 15:24:32 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 6 Text: P1388_275_003 M23-3 Air Train Vial# 80 File Text: AAP DB5
339.8597 S:6 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 112

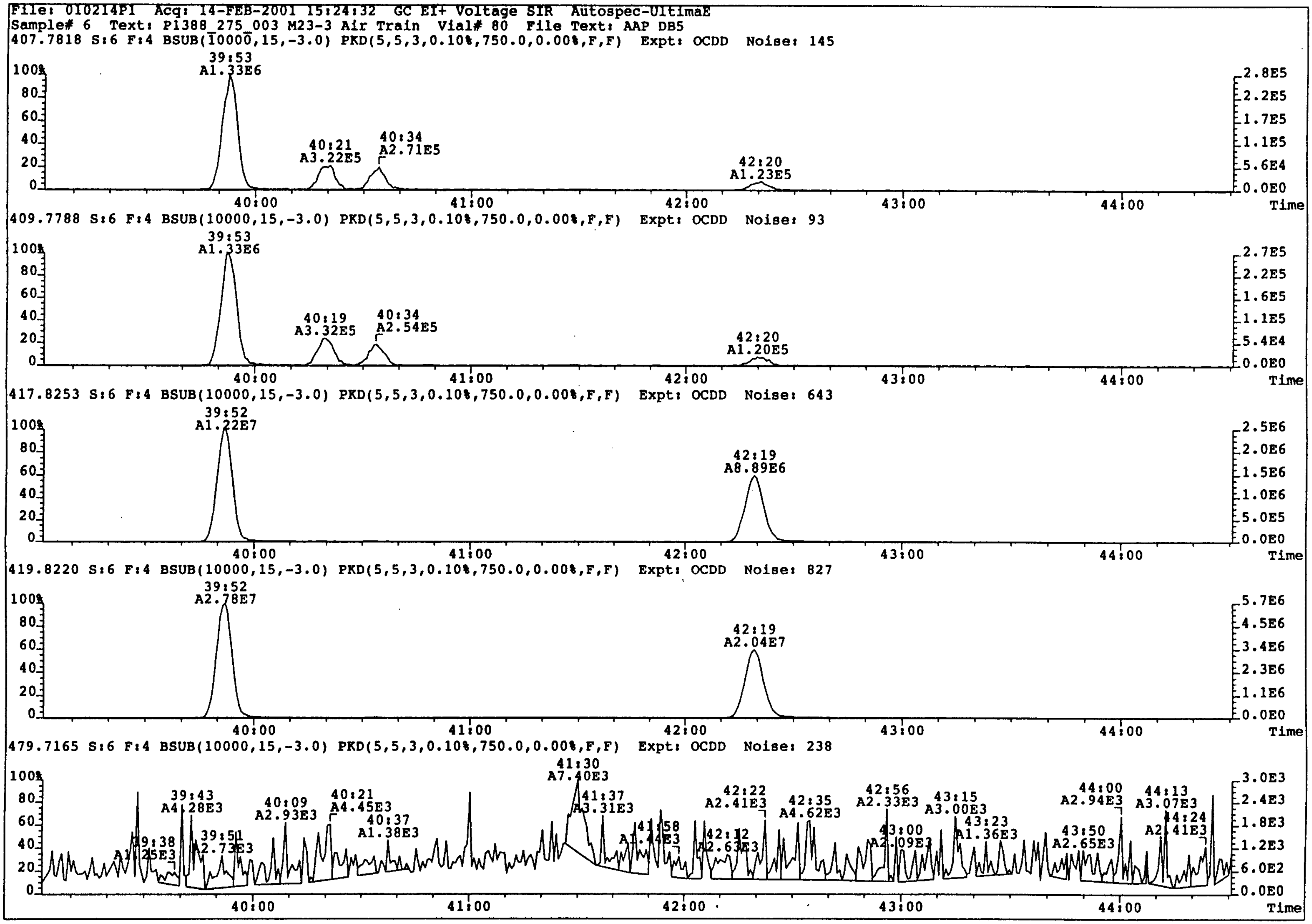
$$C = \frac{5.23 10^5 \times \cancel{4000\,pg}\ 4000\,pg}{7.50 10^7 \times 1.05 \times 1.02} \doteq 26.6$$

ee Ce
ok
Ce

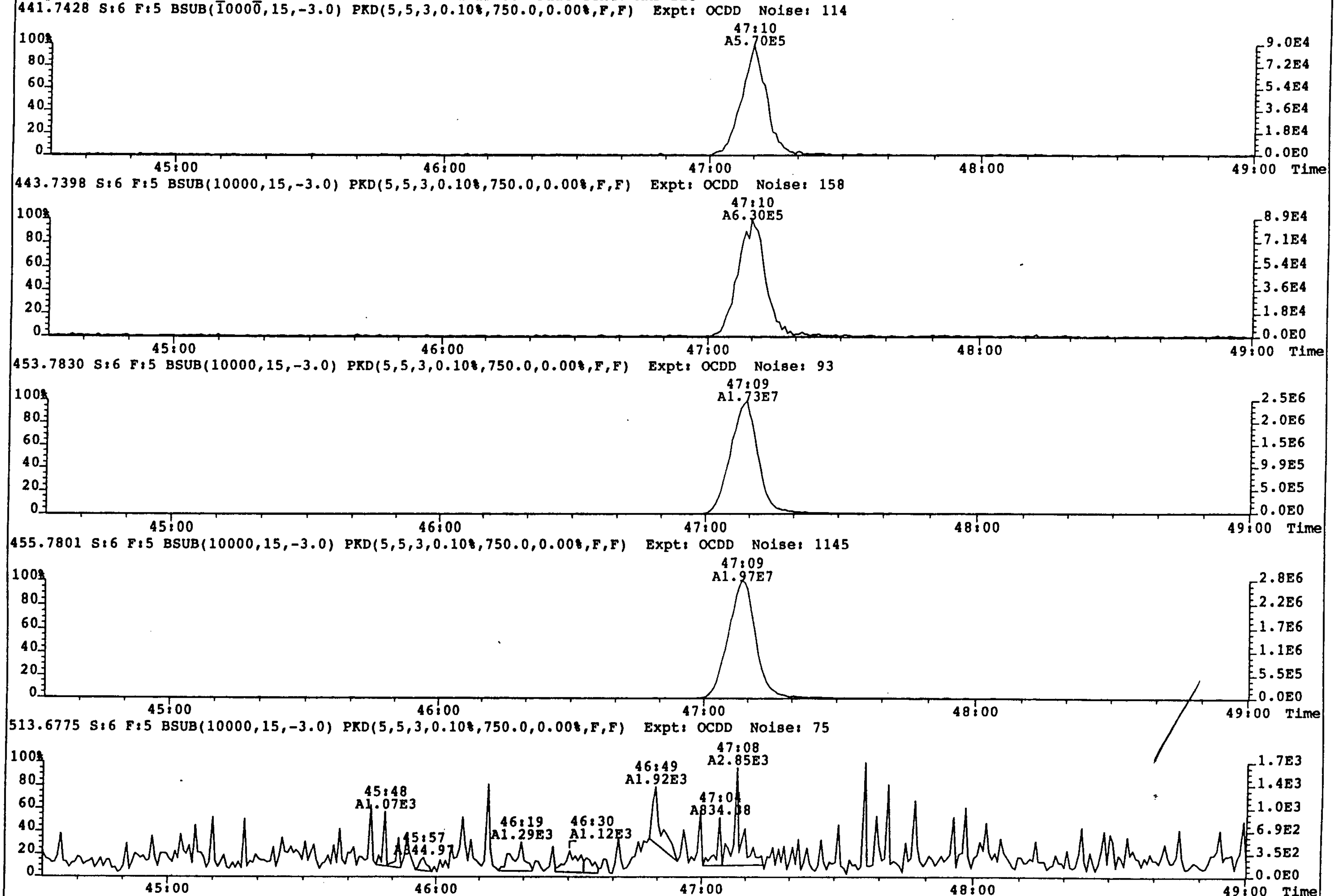




File: 010214P1 Acq: 14-FEB-2001 15:24:32 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 6 Text: P1388_275_003 M23-3 Air Train Vial# 80 File Text: AAP DB5
373.8207 S:6 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 239
34:44 A2.89E5
34:56 A8.14E5
35:11 A7.62E4
35:22 A1.02E5
35:35 A4.95E4
36:00 A3.91E5
36:15 A3.61E5
36:26 A6.62E4
36:35 A7.79E4
36:56 A5.48E5
37:58 A7.05E4
375.8178 S:6 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 224
34:44 A2.38E5
34:56 A6.67E5
35:09 A6.18E4
35:21 A8.40E4
36:00 A3.15E5
36:16 A2.82E5
36:25 A4.76E4
36:41 A6.44E4
36:55 A4.76E5
37:58 A6.32E4
383.8639 S:6 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1755
36:06 A1.50E7
36:15 A1.98E7
37:54 A1.65E7
385.8610 S:6 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1814
36:06 A2.88E7
36:15 A3.87E7
37:54 A3.20E7
445.7555 S:6 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 105
35:07 A1.08E3
35:18 A438.33
37:12 A5.99E3
37:30 A6.20E3
38:24 A980.61
38:36 A2.14E3
38:57 A4.28E3
35:00 36:00 37:00 38:00 39:00 Time


File: 010214P1 Acq: 14-FEB-2001 15:24:32 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 6 Text: P1388_275_003 M23-3 Air Train Vial# 80 File Text: AAP DB5
407.7818 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 145
39:53
A1.33E6
40:21
A3.22E5
40:34
A2.71E5
42:20
A1.23E5
409.7788 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 93
39:53
A1.33E6
40:19
A3.32E5
40:34
A2.54E5
42:20
A1.20E5
417.8253 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 643
39:52
A1.22E7
42:19
A8.89E6
419.8220 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 827
39:52
A2.78E7
42:19
A2.04E7
479.7165 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 238
41:30
A7.40E3
39:43
A4.28E3
40:09
A2.93E3
40:21
A4.45E3
40:37
A1.38E3
39:51
A2.73E3
41:37
A3.31E3
41:58
A1.44E3
42:22
A2.41E3
42:12
A2.63E3
42:35
A4.62E3
42:56
A2.33E3
43:00
A2.09E3
43:15
A3.00E3
43:23
A1.36E3
43:50
A2.65E3
44:00
A2.94E3
44:13
A3.07E3
44:24
A2.41E3
40:00
41:00
42:00
43:00
44:00
Time

File: 010214P1 Acq: 14-FEB-2001 15:24:32 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 6 Text: P1388_275_003 M23-3 Air Train Vial# 80 File Text: AAP DB5



Alta Analytical Perspectives

# Part 4

# System Performance

## MS & GC

## Concal

Documentation for the Analysis
of
Polychlorinated Dibenzo-*p*-Dioxins & Dibenzofurans

4T

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: cl

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

| NATIVE ANALYTES | M/Z'S FORMING RATIO | ION ABUND. RATIO | QC LIMITS | Pass | CONC. FOUND | CONC. RANGE (ng/mL) |
|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | M/M+2 | 0.77 | 0.65-0.89 | y | 5.38 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDD | M+2/M+4 | 1.57 | 1.32-1.78 | y | 26.24 | 18.75-31.25 |
| 1,2,3,4,7,8-HxCDD | M+2/M+4 | 1.25 | 1.05-1.43 | y | 25.21 | 18.75-31.25 |
| 1,2,3,6,7,8-HxCDD | M+2/M+4 | 1.24 | 1.05-1.43 | y | 25.49 | 18.75-31.25 |
| 1,2,3,7,8,9-HxCDD | M+2/M+4 | 1.25 | 1.05-1.43 | y | 24.67 | 18.75-31.25 |
| 1,2,3,4,6,7,8-HpCDD | M+2/M+4 | 1.03 | 0.88-1.20 | y | 25.05 | 18.75-31.25 |
| OCDD | M+2/M+4 | 0.88 | 0.76-1.02 | y | 51.12 | 37 - 65 |
| 2,3,7,8-TCDF | M/M+2 | 0.75 | 0.65-0.89 | y | 4.54 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDF | M+2/M+4 | 1.53 | 1.32-1.78 | y | 23.76 | 18.75-31.25 |
| 2,3,4,7,8-PeCDF | M+2/M+4 | 1.54 | 1.32-1.78 | y | 23.32 | 18.75-31.25 |
| 1,2,3,4,7,8-HxCDF | M+2/M+4 | 1.23 | 1.05-1.43 | y | 24.39 | 18.75-31.25 |
| 1,2,3,6,7,8-HxCDF | M+2/M+4 | 1.19 | 1.05-1.43 | y | 24.08 | 18.75-31.25 |
| 2,3,4,6,7,8-HxCDF | M+2/M+4 | 1.23 | 1.05-1.43 | y | 24.18 | 18.75-31.25 |
| 1,2,3,7,8,9-HxCDF | M+2/M+4 | 1.25 | 1.05-1.43 | y | 24.51 | 18.75-31.25 |
| 1,2,3,4,6,7,8-HpCDF | M+2/M+4 | 1.02 | 0.88-1.20 | y | 23.56 | 18.75-31.25 |
| 1,2,3,4,7,8,9-HpCDF | M+2/M+4 | 1.02 | 0.88-1.20 | y | 23.07 | 18.75-31.25 |
| OCDF | M+2/M+4 | 0.89 | 0.76-1.02 | y | 47.99 | 35 - 65 |

Analyst: GAG

Date: 20 Feb01

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: CL

Date: 24 Feb01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

| LABELED COMPOUNDS | M/Z'S FORMING RATIO | ION ABUND. RATIO | QC LIMITS | Pass | CONC. FOUND | CONC. RANGE (ng/mL) |
|---|---|---|---|---|---|---|
| 13C-2,3,7,8-TCDD | M/M+2 | 0.78 | 0.65-0.89 | y | 93.7 | 70.0 - 130.0 |
| 13C-1,2,3,7,8-PeCDD | M+2/M+4 | 1.57 | 1.32-1.78 | y | 99.6 | 70.0 - 130.0 |
| 13C-1,2,3,6,7,8-HxCDD | M+2/M+4 | 1.23 | 1.05-1.43 | y | 97.7 | 70.0 - 130.0 |
| 13C-1,2,3,4,6,7,8-HpCDD | M+2/M+4 | 1.03 | 0.88-1.20 | y | 92.1 | 70.0 - 130.0 |
| 13C-OCDD | M+2/M+4 | 0.89 | 0.76-1.02 | y | 93.3 | 70.0 - 130.0 |
| 13C-2,3,7,8-TCDF | M/M+2 | 0.77 | 0.65-0.89 | y | 92.9 | 70.0 - 130.0 |
| 13C-1,2,3,7,8-PeCDF | M+2/M+4 | 1.54 | 1.32-1.78 | y | 94.5 | 70.0 - 130.0 |
| 13C-1,2,3,6,7,8-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 82.8 | 70.0 - 130.0 |
| 13C-1,2,3,4,6,7,8-HpCDF | M/M+2 | 0.44 | 0.37-0.51 | y | 83.3 | 70.0 - 130.0 |
| 13C-OCDF | M+2/M+4 | 0.89 | 0.76-1.02 | y | 87.3 | 70.0 - 130.0 |
| | | | | | | |
| 37Cl-2,3,7,8-TCDD | | | | | 103.3 | 75.0 - 125.0 |
| 13C-2,3,4,7,8-PeCDF | M+2/M+4 | 1.55 | 1.32-1.78 | y | 101.3 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8-HxCDD | M+2/M+4 | 1.29 | 1.05-1.43 | y | 100.7 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 104.1 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8,9-HpCDF | M/M+2 | 0.43 | 0.37-0.51 | y | 99.9 | 75.0 - 125.0 |
| | | | | | | |
| 13C-1,2,3,7,8,9-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 86.8 | 75.0 - 125.0 |

Analyst: GAG

Date: 20 Feb01

Client ID: DB5 CPSM / M23 CS3 Filename: 010214P1 S: 1 Acq: 14-FEB-01 11:05:47 ConCal: 010214P1- 
Lab ID: CS3RC GC Column ID: db-5 ICal: MM1_M23_0: Wt/vol: 1.000 EndCal: 010214P1-

Reviewer: Ce
Date: 24 Feb 01

| | Name | Resp | RA | | RRF | RT | Conc | Qualif. | CDE | noise | Fac | DL | EMPC | Rec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2,3,7,8-TCDD | 4.34e+06 | 0.77 | y | 1.26 | 27:45 | 5.38 | | | 1127 | 2.5 | 0.0253 | | |
| | 1,2,3,7,8-PeCDD | 1.47e+07 | 1.57 | y | 1.01 | 33:12 | 26.2 | | | 1019 | 2.5 | 0.0434 | | |
| | 1,2,3,4,7,8-HxCDD | 1.40e+07 | 1.25 | y | 1.14 | 37:06 | 25.2 | | | 2400 | 2.5 | 0.0945 | | |
| | 1,2,3,6,7,8-HxCDD | 1.27e+07 | 1.24 | y | 1.02 | 37:13 | 25.5 | | | 2400 | 2.5 | 0.105 | | |
| | 1,2,3,7,8,9-HxCDD | 1.37e+07 | 1.25 | y | 1.14 | 37:32 | 24.7 | | | 2400 | 2.5 | 0.0942 | | |
| | 1,2,3,4,6,7,8-HpCDD | 1.26e+07 | 1.03 | y | 1.13 | 41:31 | 25.0 | | | 2426 | 2.5 | 0.137 | | |
| | OCDD | 1.92e+07 | 0.88 | y | 1.03 | 46:51 | 51.1 | | | 1515 | 2.5 | 0.139 | | |
| | 2,3,7,8-TCDF | 3.83e+06 | 0.75 | y | 1.05 | 26:51 | 4.54 | | | 2169 | 2.5 | 0.0492 | | |
| | 1,2,3,7,8-PeCDF | 1.83e+07 | 1.53 | y | 1.04 | 31:43 | 23.8 | | | 1447 | 2.5 | 0.0435 | | |
| | 2,3,4,7,8-PeCDF | 1.82e+07 | 1.54 | y | 1.05 | 32:51 | 23.3 | | | 1447 | 2.5 | 0.0428 | | |
| | 1,2,3,4,7,8-HxCDF | 1.57e+07 | 1.23 | y | 1.13 | 36:08 | 24.4 | | | 2488 | 2.5 | 0.0544 | | |
| | 1,2,3,6,7,8-HxCDF | 1.69e+07 | 1.19 | y | 1.24 | 36:16 | 24.1 | | | 2488 | 2.5 | 0.0498 | | |
| | 2,3,4,6,7,8-HxCDF | 1.60e+07 | 1.23 | y | 1.16 | 36:55 | 24.2 | | | 2488 | 2.5 | 0.0529 | | |
| | 1,2,3,7,8,9-HxCDF | 1.42e+07 | 1.25 | y | 1.02 | 37:56 | 24.5 | | | 2488 | 2.5 | 0.0605 | | |
| | 1,2,3,4,6,7,8-HpCDF | 1.46e+07 | 1.02 | y | 1.54 | 39:53 | 23.6 | | | 2715 | 2.5 | 0.0755 | | |
| | 1,2,3,4,7,8,9-HpCDF | 1.20e+07 | 1.02 | y | 1.30 | 42:20 | 23.1 | | | 2715 | 2.5 | 0.0896 | | |
| | OCDF | 2.08e+07 | 0.89 | y | 1.15 | 47:10 | 48.0 | | | 1591 | 2.5 | 0.122 | | |
| | Total Tetra-Dioxins | 1.74e+07 | 0.80 | y | 1.26 | 24:00 | 21.6 | | | 1127 | 2.5 | 0.0253 | 21.7 | |
| | Total Penta-Dioxins | 3.92e+07 | 1.53 | y | 1.01 | 30:39 | 69.9 | | | 1019 | 2.5 | 0.0434 | 70.0 | |
| | Total Hexa-Dioxins | 4.19e+07 | 1.26 | y | 1.10 | 35:24 | 78.0 | | | 2400 | 2.5 | 0.0977 | 78.5 | |
| | Total Hepta-Dioxins | 2.32e+07 | 1.03 | y | 1.13 | 40:19 | 46.0 | | | 2426 | 2.5 | 0.137 | 46.3 | |
| | Total Tetra-Furans | 9.58e+06 | 0.75 | y | 1.05 | 21:50 | 11.3 | | | 2169 | 2.5 | 0.0492 | 11.5 | |
| | 1st Fnc. Penta-Furans | 1.76e+07 | 1.58 | y | 1.05 | 28:51 | 22.6 | | | 2634 | 2.5 | 0.0785 | 22.6 | |
| | Total Penta-Furans | 5.17e+07 | 1.53 | y | 1.05 | 31:43 | 66.6 | | | 1447 | 2.5 | 0.0431 | | |
| | PeCDF Totals: | | | | | | 89.3 | | | | | | 89.5 | |
| | Total Hexa-Furans | 6.46e+07 | 1.24 | y | 1.14 | 34:44 | 100 | | | 2488 | 2.5 | 0.0541 | 100 | |
| | Total Hepta-Furans | 2.67e+07 | 1.02 | y | 1.42 | 39:53 | 46.8 | | | 2715 | 2.5 | 0.0819 | 47.1 | |
| IS | 13C-2,3,7,8-TCDD | 6.40e+07 | 0.78 | y | 1.13 | 27:43 | 93.7 | | | | | | | 93.7 |
| IS | 13C-1,2,3,7,8-PeCDD | 5.54e+07 | 1.57 | y | 0.93 | 33:11 | 99.6 | | | | | | | 99.6 |
| IS | 13C-1,2,3,6,7,8-HxCDD | 4.87e+07 | 1.23 | y | 0.93 | 37:12 | 97.7 | | | | | | | 97.7 |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.46e+07 | 1.03 | y | 0.91 | 41:30 | 92.1 | | | | | | | 92.1 |
| IS | 13C-OCDD | 3.66e+07 | 0.89 | y | 0.73 | 46:50 | 93.3 | | | | | | | 93.3 |
| IS | 13C-2,3,7,8-TCDF | 8.07e+07 | 0.77 | y | 1.06 | 26:50 | 92.9 | | | | | | | 92.9 |
| IS | 13C-1,2,3,7,8-PeCDF | 7.42e+07 | 1.54 | y | 0.96 | 31:42 | 94.5 | | | | | | | 94.5 |
| IS | 13C-1,2,3,6,7,8-HxCDF | 5.67e+07 | 0.52 | y | 1.28 | 36:15 | 82.8 | | | | | | | 82.8 |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 4.02e+07 | 0.44 | y | 0.90 | 39:52 | 83.3 | | | | | | | 83.3 |
| IS | 13C-OCDF | 3.78e+07 | 0.89 | y | 0.81 | 47:09 | 87.3 | | | | | | | 87.3 |
| RS/RT | 13C-1,2,3,4-TCDD | 6.02e+07 | 0.79 | y | 1.00 | 27:03 | 100 | | | | | | | - |
| RS | 13C-1,2,3,4-TCDF | 8.20e+07 | 0.77 | y | 1.00 | 25:27 | 100 | | | | | | | - |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD | 5.34e+07 | 1.23 | y | 1.00 | 37:31 | 100 | | | | | | | - |
| PS | 37Cl-2,3,7,8-TCDD | 3.40e+07 | | | 0.51 | 27:45 | 103 | | | | | | | 103 |
| PS | 13C-2,3,4,7,8-PeCDF | 7.32e+07 | 1.55 | y | 0.97 | 32:50 | 101 | | | | | | | 101 |
| PS | 13C-1,2,3,4,7,8-HxCDD | 4.53e+07 | 1.29 | y | 0.92 | 37:05 | 101 | | | | | | | 101 |
| PS | 13C-1,2,3,4,7,8-HxCDF | 5.37e+07 | 0.52 | y | 0.91 | 36:06 | 104 | | | | | | | 104 |
| PS | 13C-1,2,3,4,7,8,9-HpCDF | 3.43e+07 | 0.43 | y | 0.85 | 42:20 | 99.9 | | | | | | | 99.9 |
| AS | 13C-1,2,3,7,8,9-HxCDF | 4.96e+07 | 0.52 | y | 1.07 | 37:55 | 86.8 | | | | | | | 86.8 |

Analyst: GAG
Date: 20Feb01

FORM 5

PCDD/PCDF RT WINDOW AND ISOMER SPECIFICITY STANDARDS

Lab Name: Alta Analytical Perspectives Episode No.:

Contract No.: SAS No.:

Reviewer: CL

Instrument ID: MM-1 Initial Calibration Date: 10/5/00

RT Window Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

Date: 24 Feb Ø1

DB-5 IS Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

DB_225 IS Data Filename: Analysis Date: Time:

DB-5 RT WINDOW DEFINING STANDARDS RESULTS

| ISOMERS | ABSOLUTE RT | ISOMERS | ABSOLUTE RT |
|---|---|---|---|
| 1,3,6,8-TCDD (F) | 24:00 | 1,3,6,8-TCDF (F) | 21:50 |
| 1,2,8,9-TCDD (L) | 28:45 | 1,2,8,9-TCDF (L) | 28:54 |
| 1,2,4,7,9-PeCDD (F) | 30:39 | 1,3,4,6,8-PeCDF (F) | 28:51 |
| 1,2,3,8,9-PeCDD (L) | 33:39 | 1,2,3,8,9-PeCDF (L) | 33:56 |
| 1,2,4,6,7,9-HxCDD (F) | 35:24 | 1,2,3,4,6,8-HxCDF (F) | 34:44 |
| 1,2,3,7,8,9-HxCDD (L) | 37:32 | 1,2,3,7,8,9-HxCDF (L) | 37:56 |
| 1,2,3,4,6,7,9-HpCDD (F) | 40:19 | 1,2,3,4,6,7,8-HpCDF (F) | 39:53 |
| 1,2,3,4,6,7,8-HpCDD (L) | 41:31 | 1,2,3,4,7,8,9-HpCDF (L) | 42:20 |

(F) = First eluting isomer (DB-5); (L) = Last eluting isomer (DB-5).

================================================================================

ISOMER SPECIFICITY (IS) TEST STANDARD RESULTS

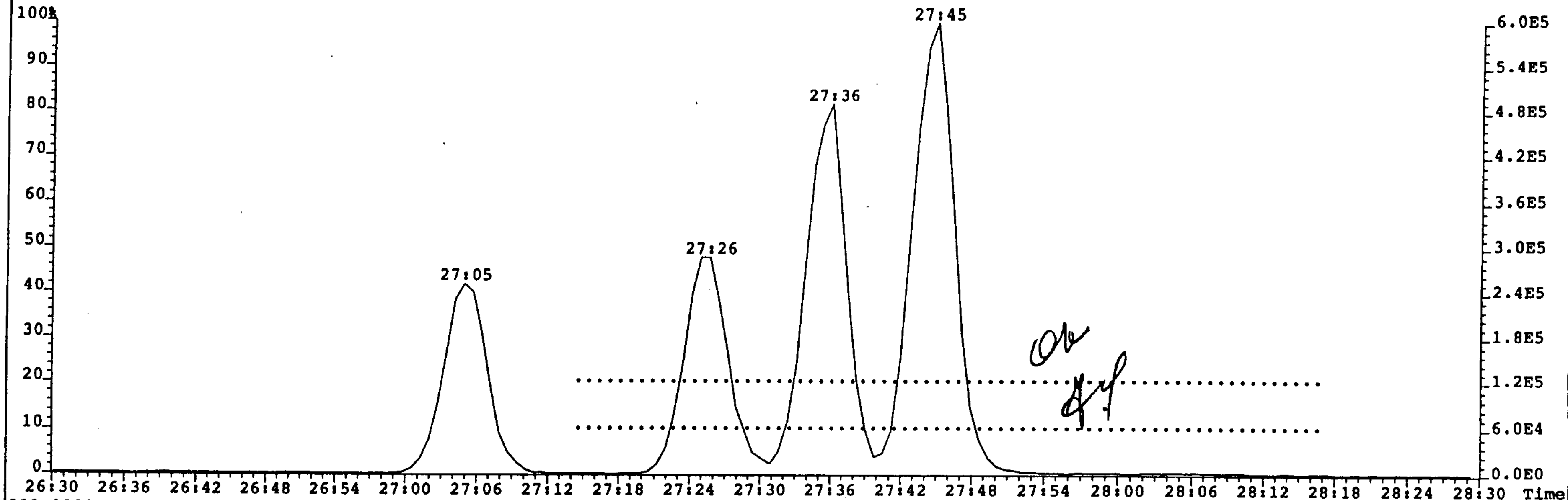
% VALLEY HEIGHT
BETWEEN
COMPARED PEAKS (1)

<25%

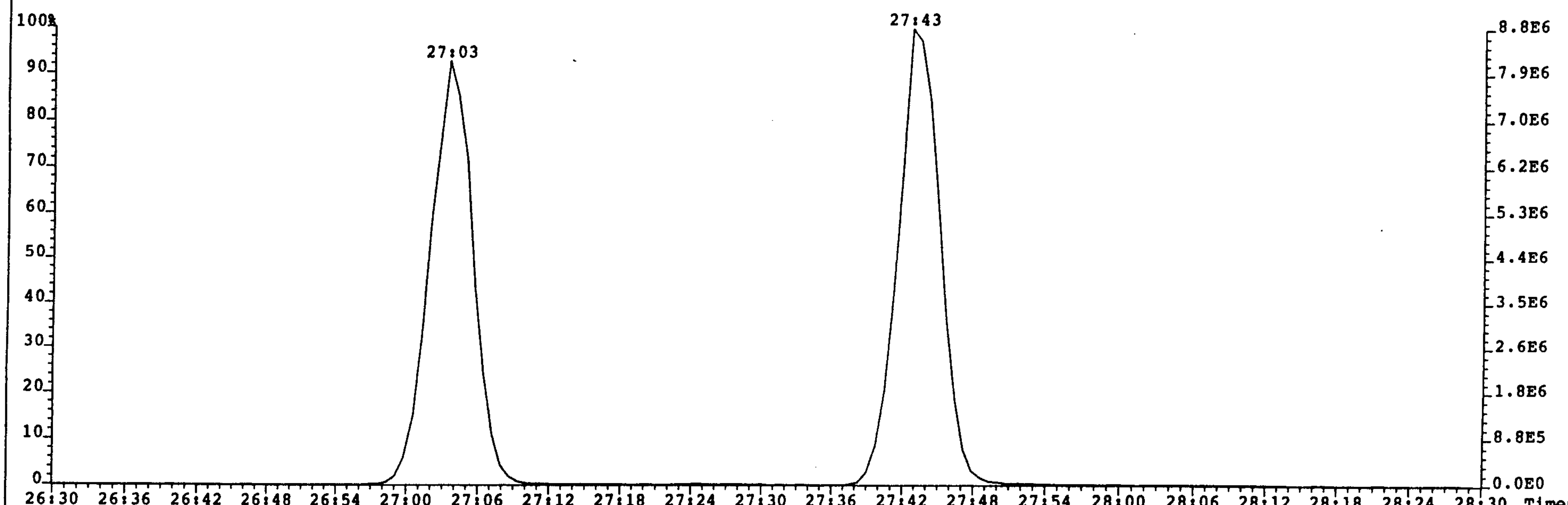
Analyst: GAG

Date: 20 Feb 01

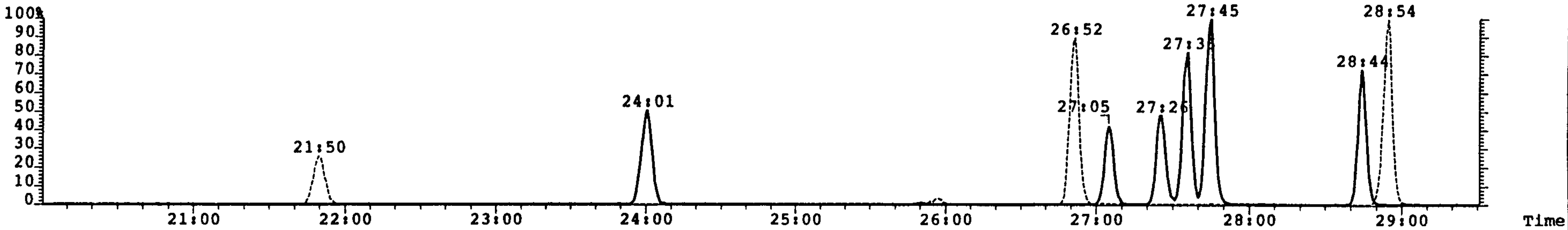
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
321.8936 Expt: OCDD



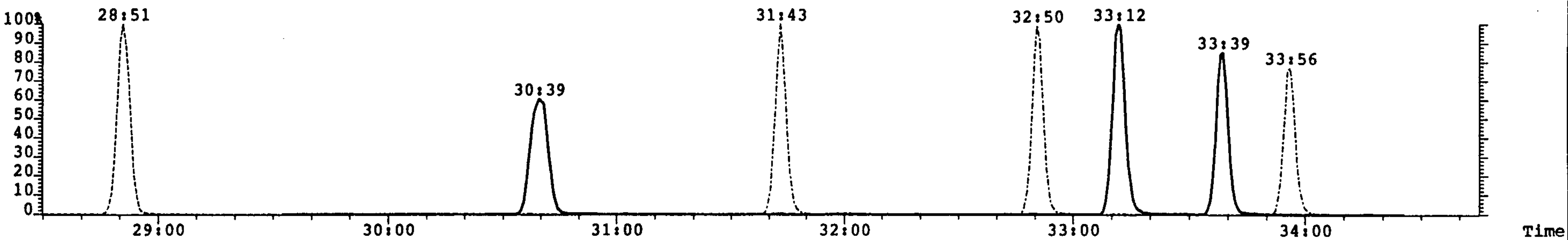

333.9339 Expt: OCDD



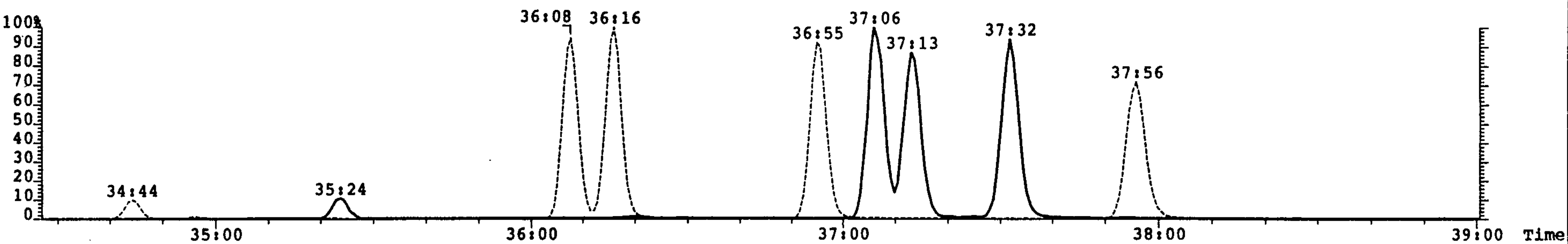
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
305.8987,321.8936 Expt: OCDD



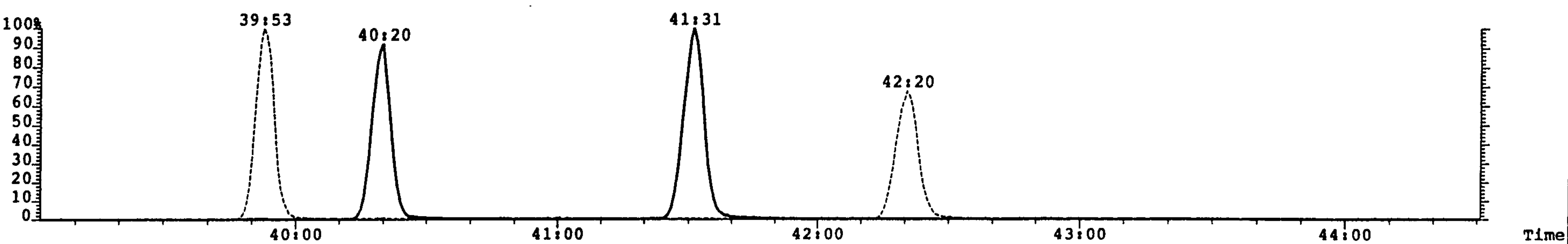

339.8597,355.8546 F:2,339.8597 F:2 Expt: OCDD



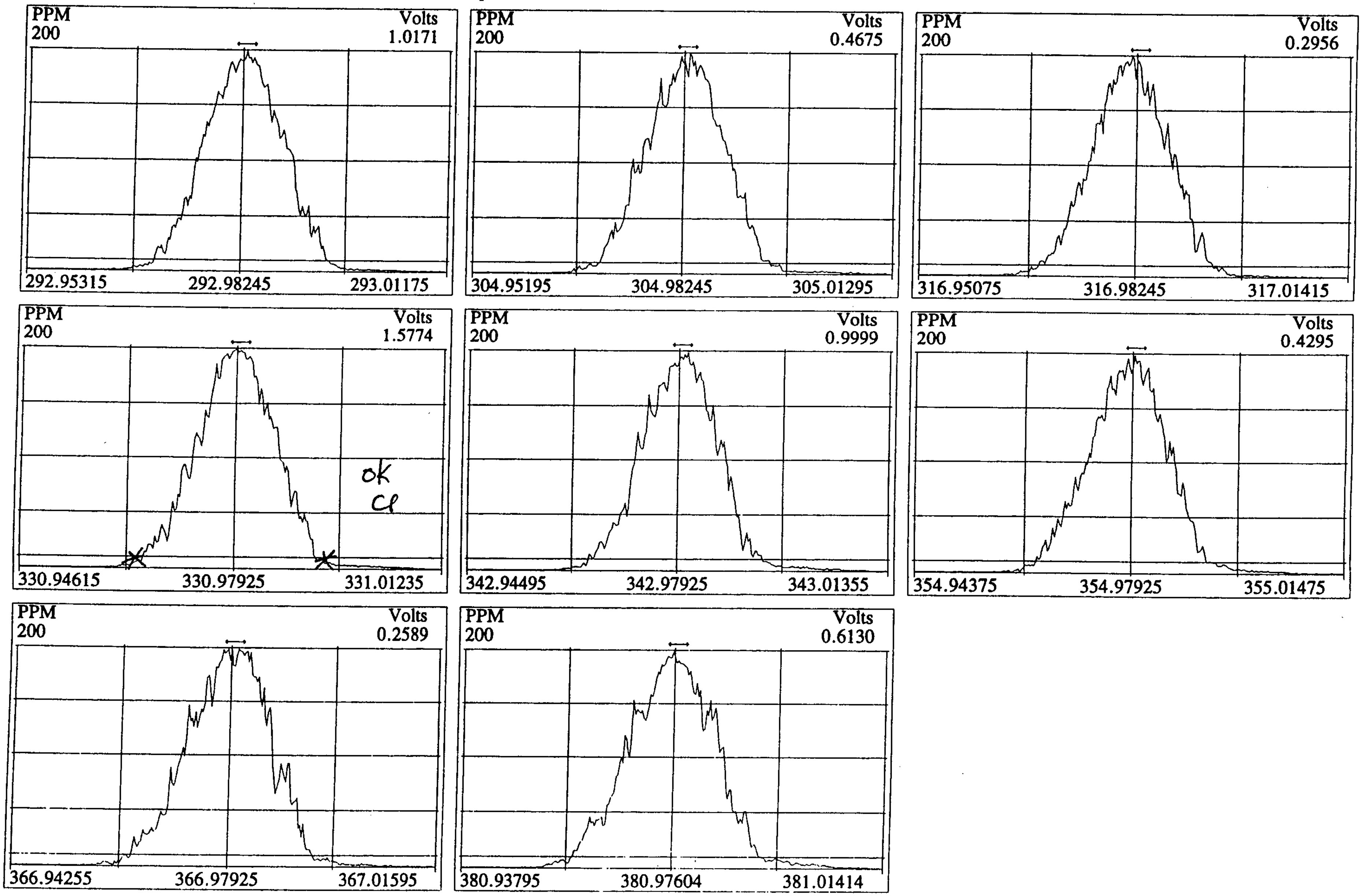

F:3 373.8207,389.8156 Expt: OCDD



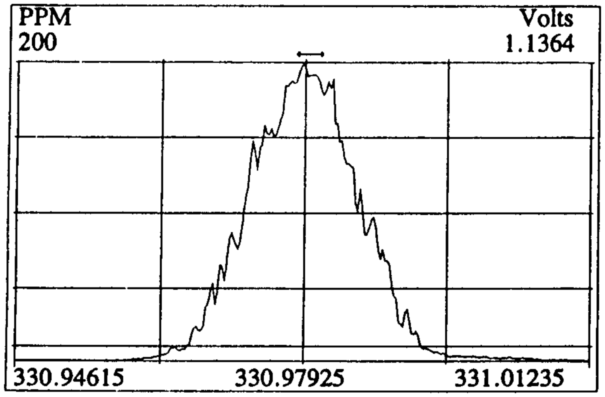

F:4 407.7818,423.7767 Expt: OCDD

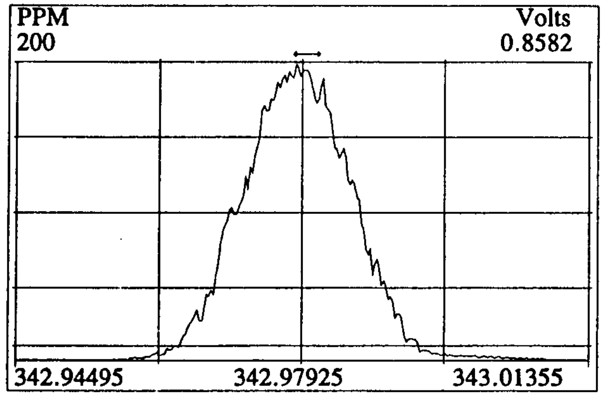


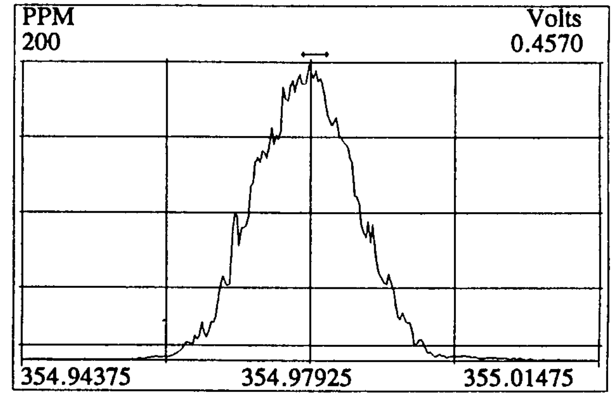
Peak Locate Examination:14-FEB-2001:11:02 File:010214P1
Experiment:OCDD Function:1 Reference:PFK2

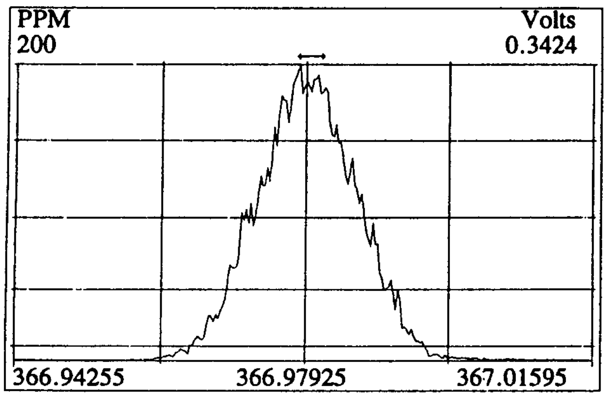


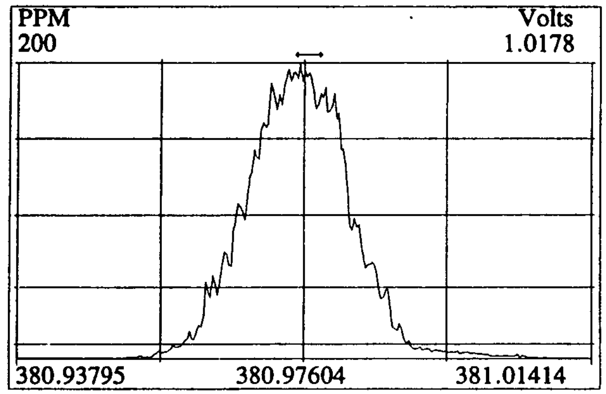
Peak Locate Examination:14-FEB-2001:11:02 File:010214P1
Experiment:OCDD Function:2 Reference:PFK2

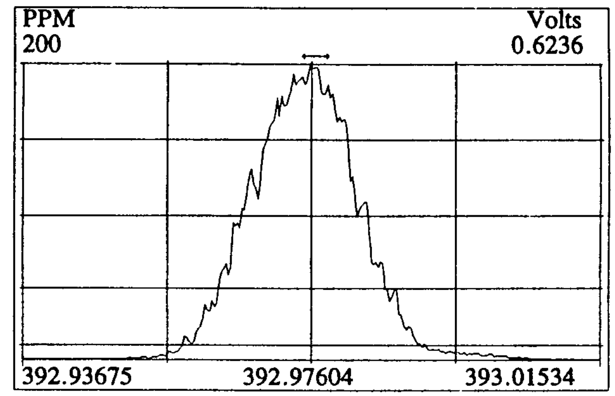


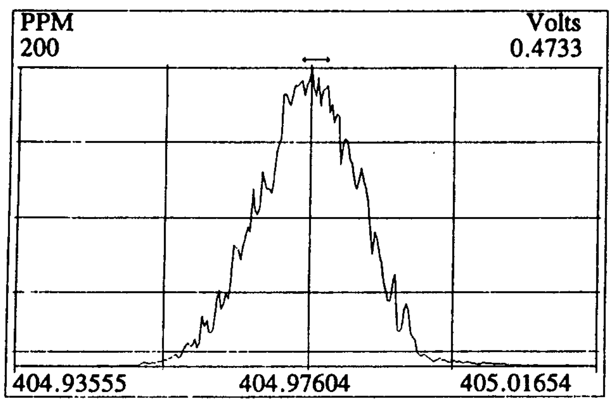



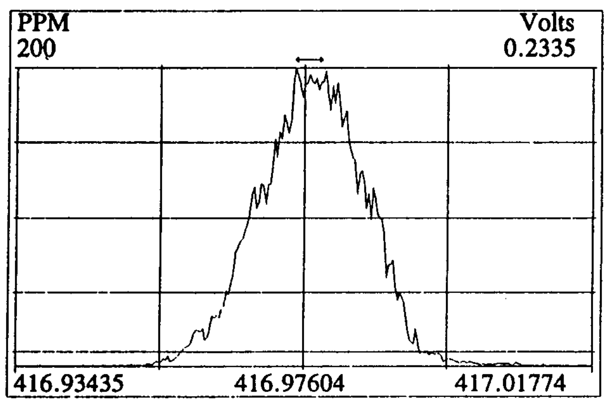



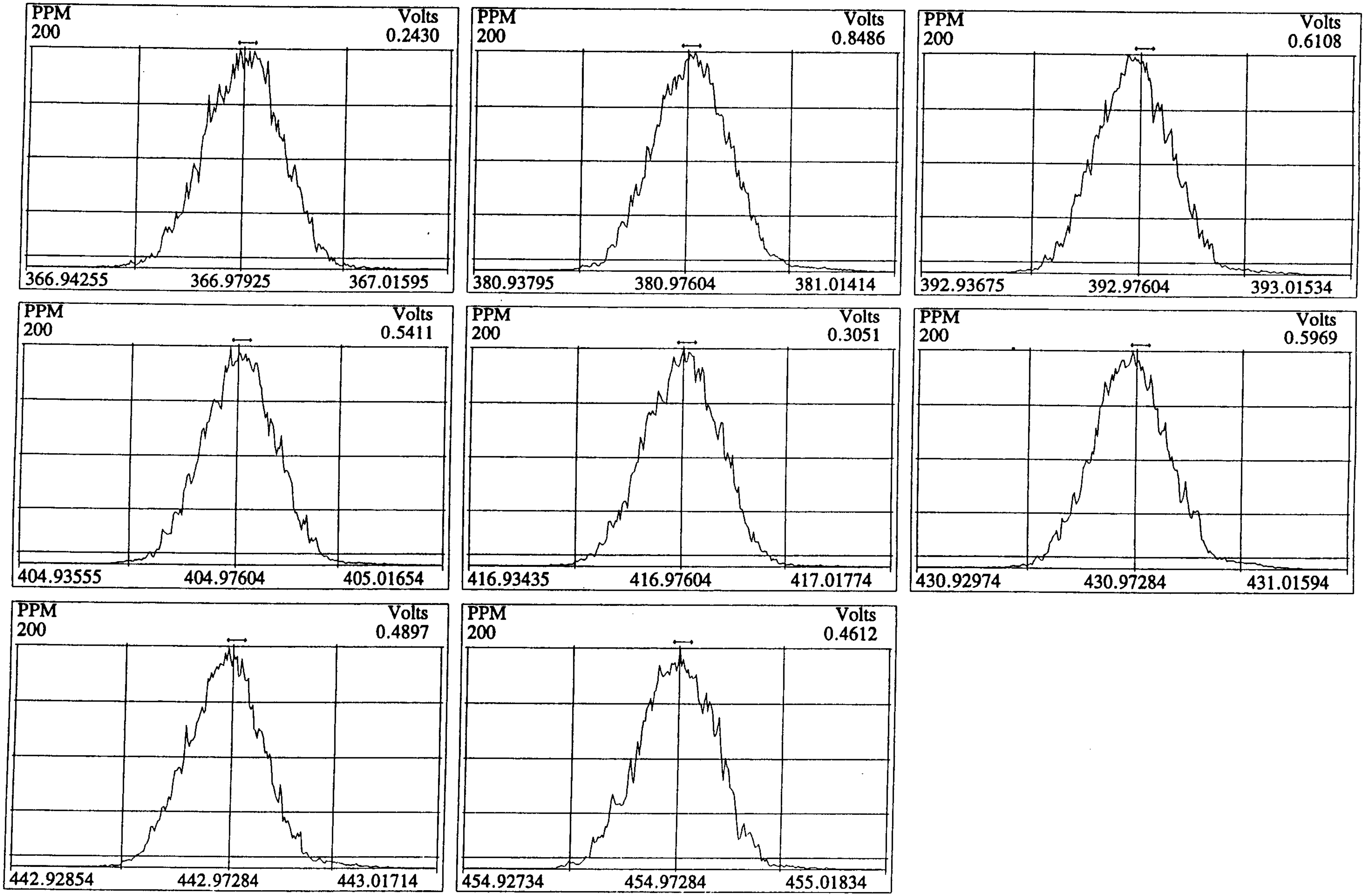



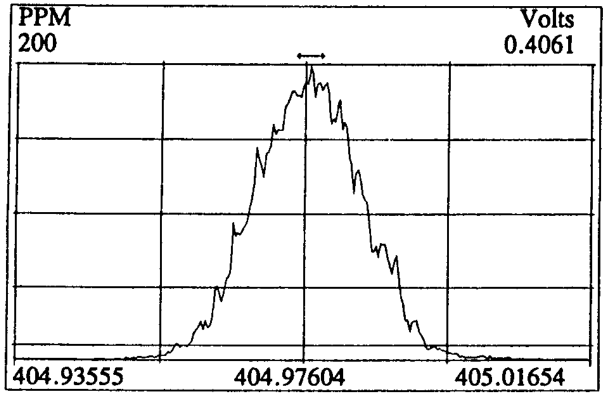



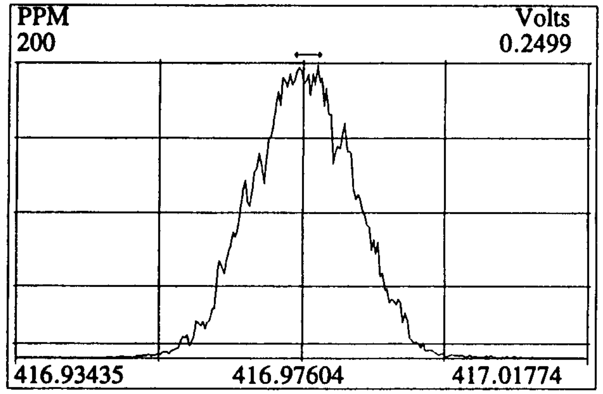



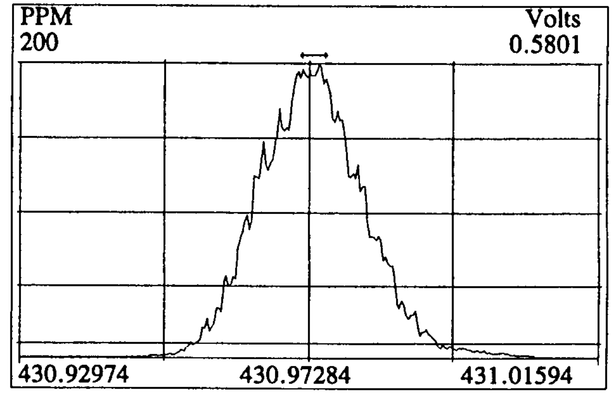
Peak Locate Examination:14-FEB-2001:11:03 File:010214P1
Experiment:OCDD Function:3 Reference:PFK2

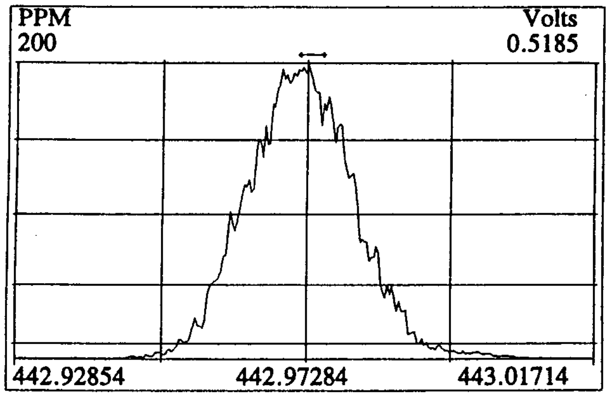


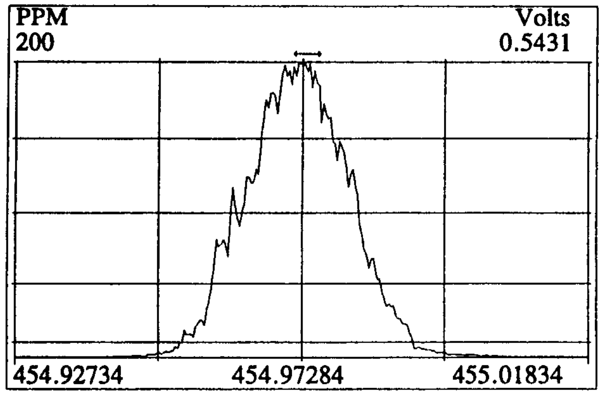
Peak Locate Examination:14-FEB-2001:11:04 File:010214P1
Experiment:OCDD Function:4 Reference:PFK2

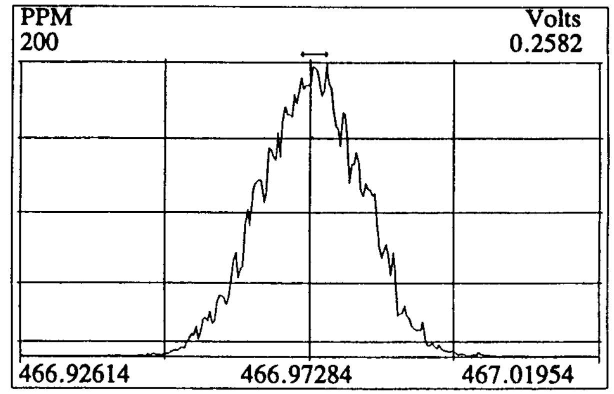


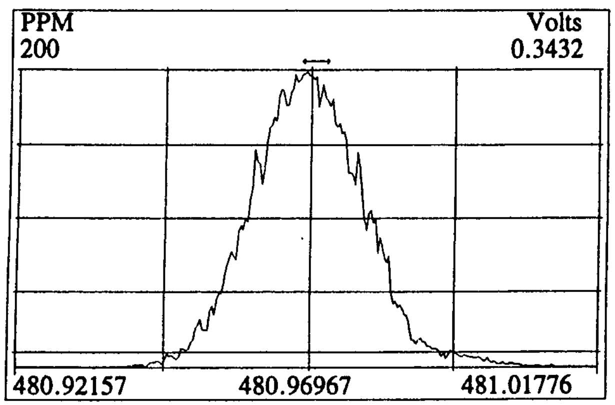



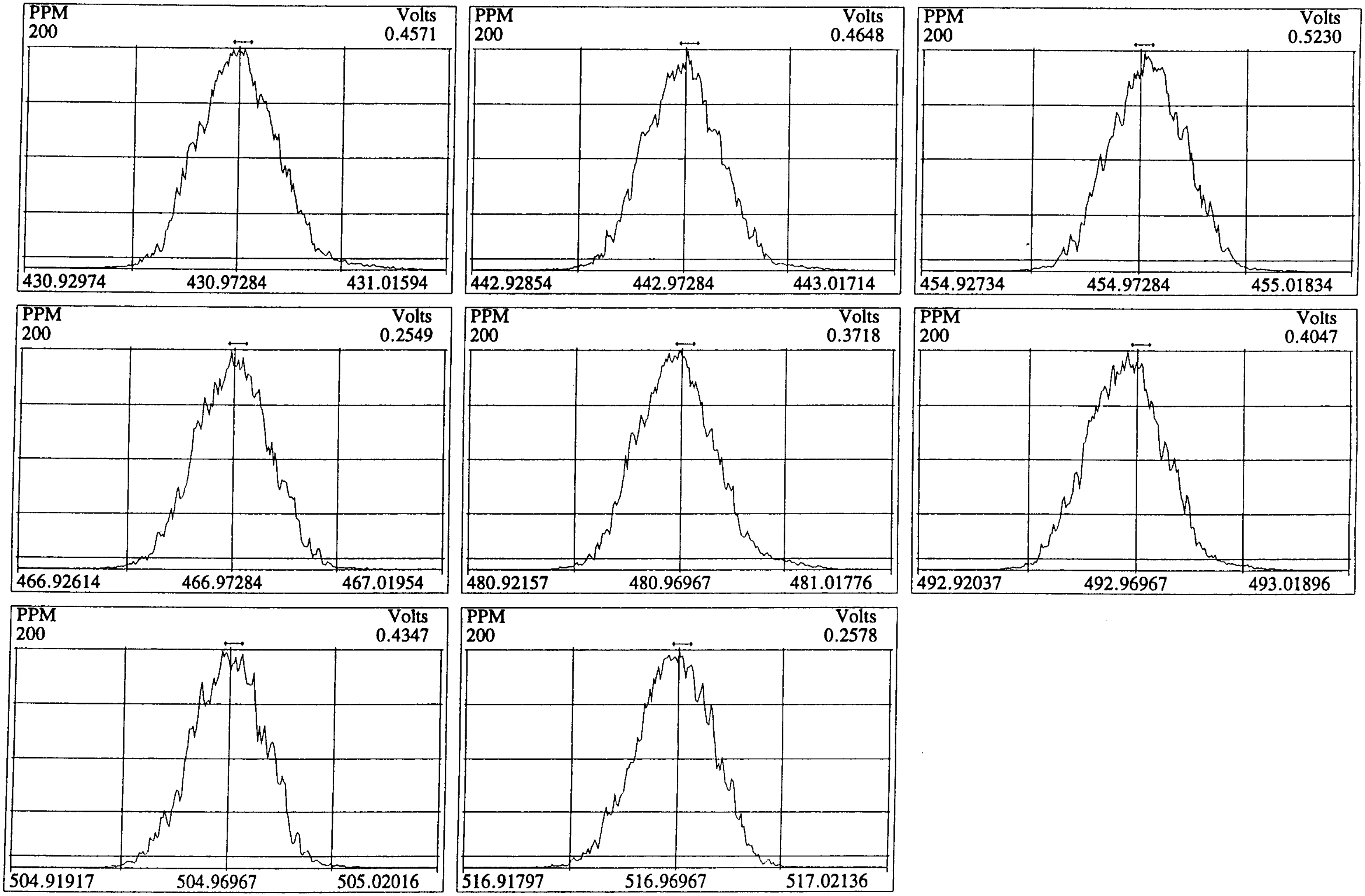



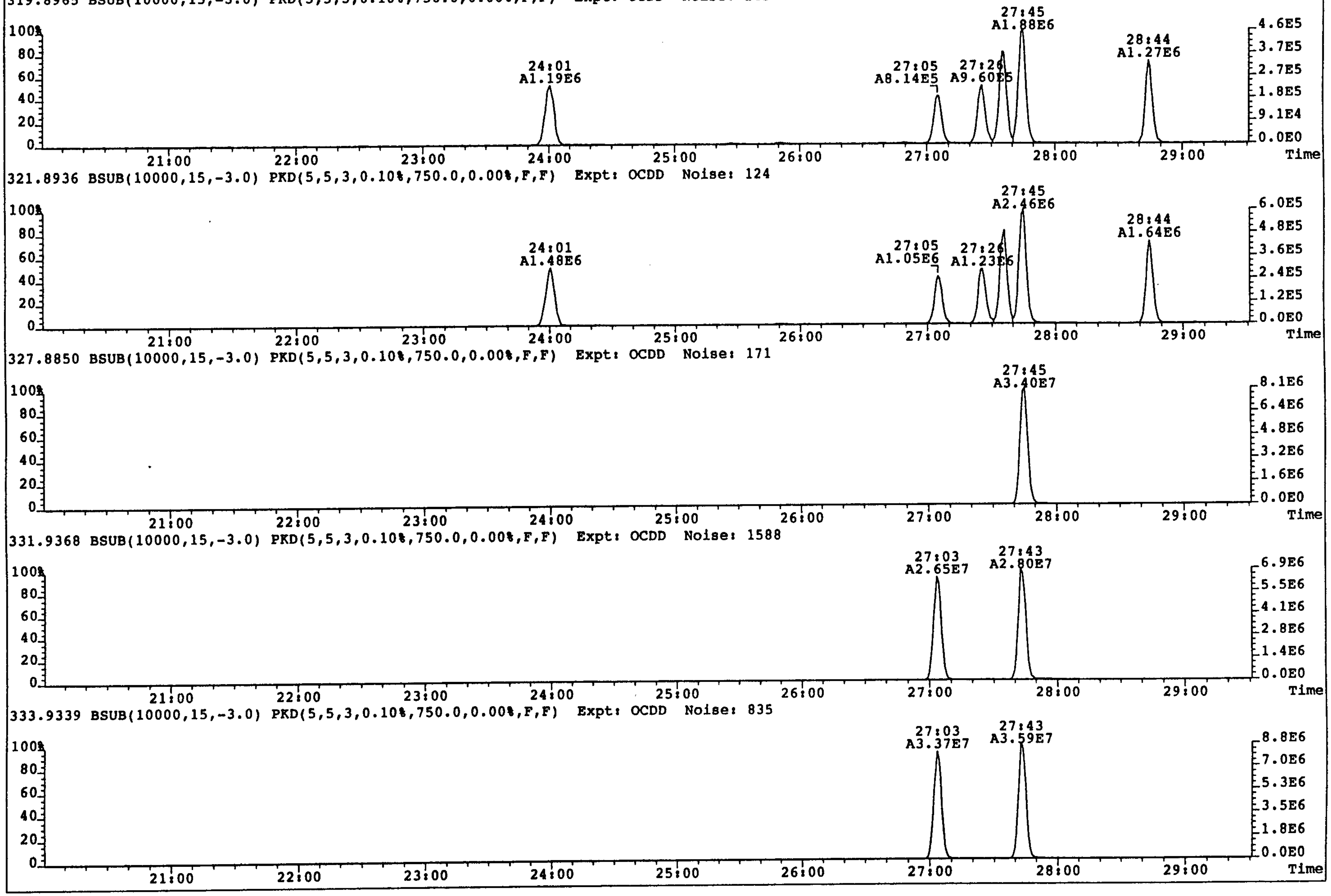



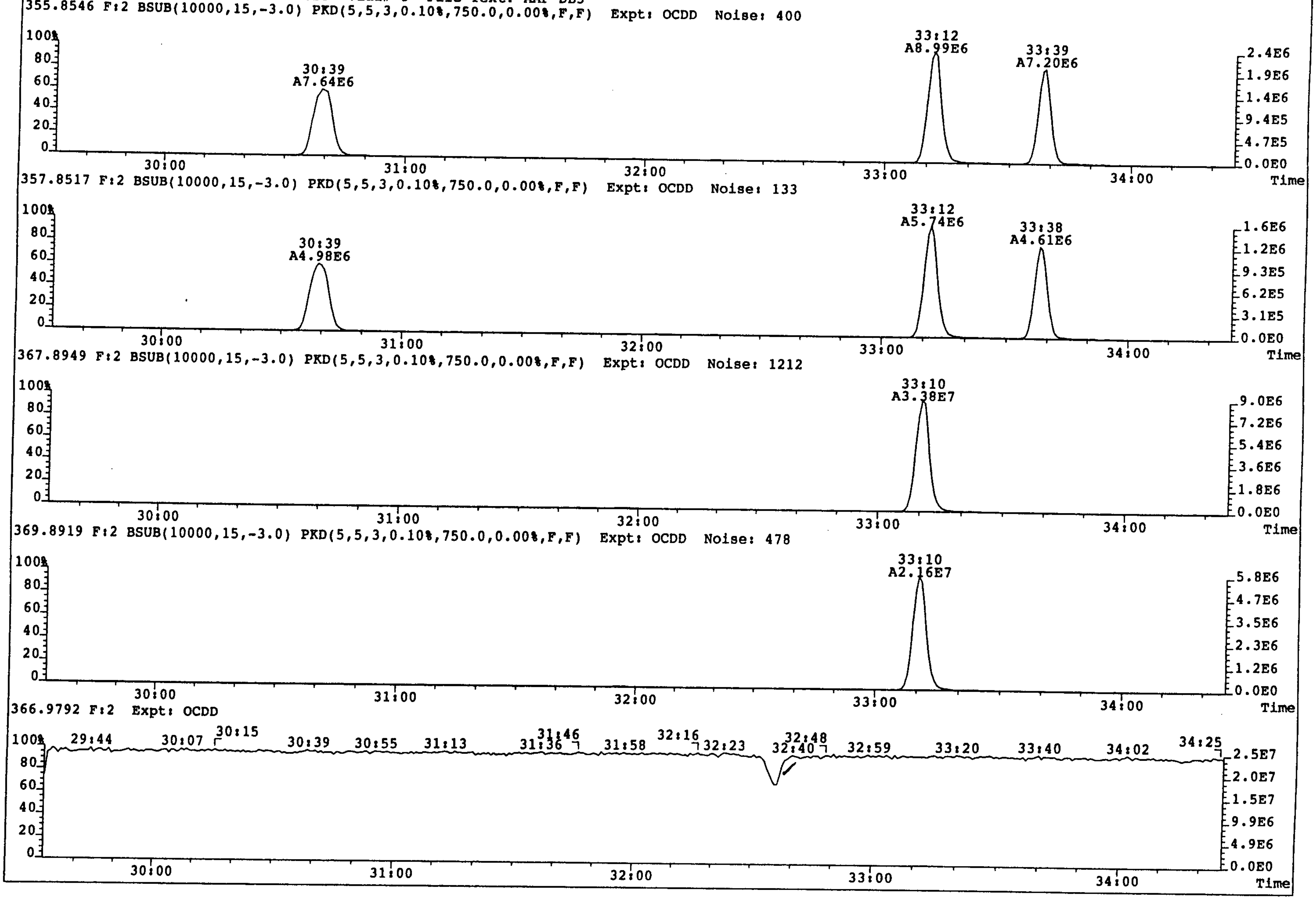
Peak Locate Examination:14-FEB-2001:11:04 File:010214P1
Experiment:OCDD Function:5 Reference:PFK2

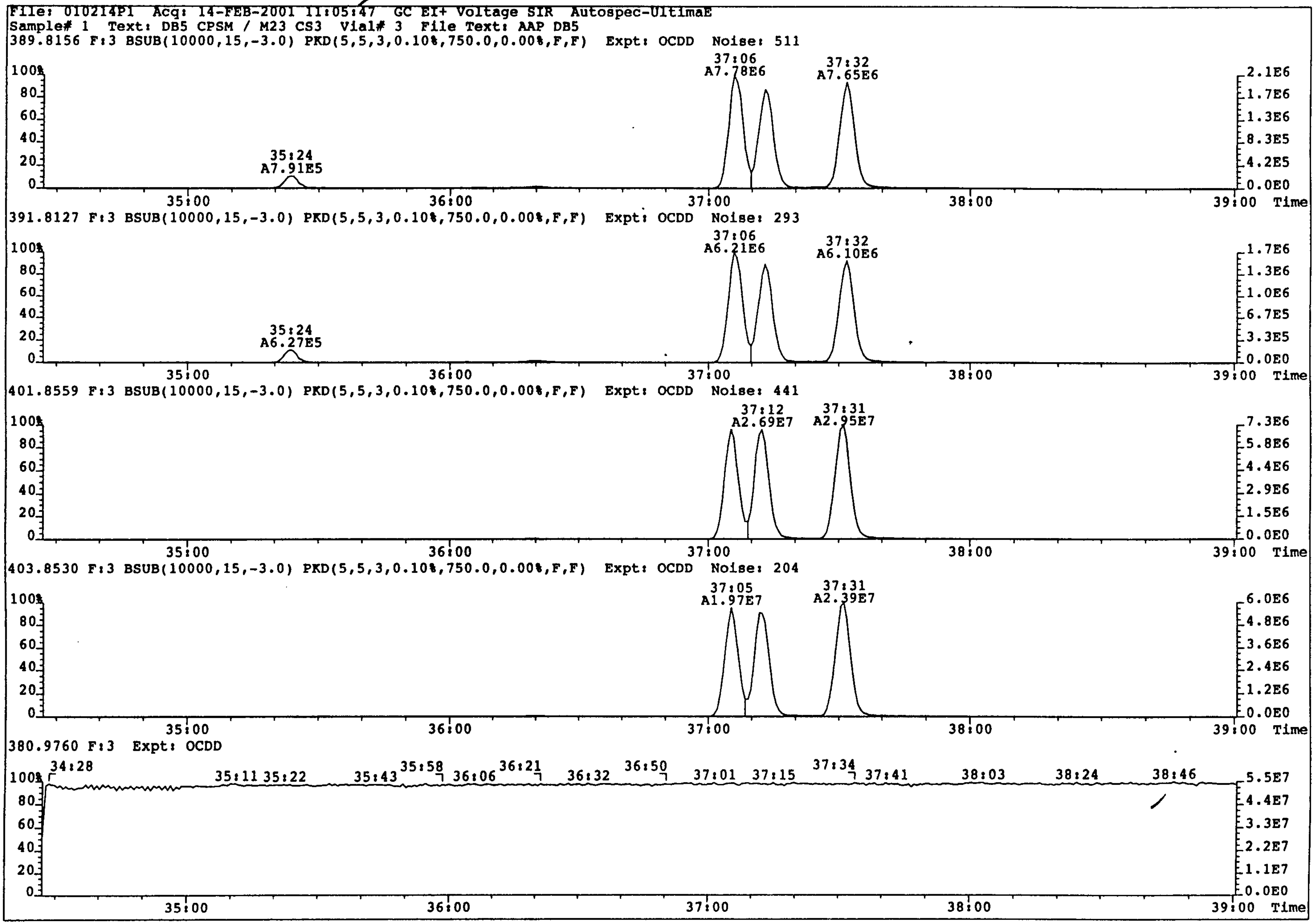


File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
319.8965 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 243

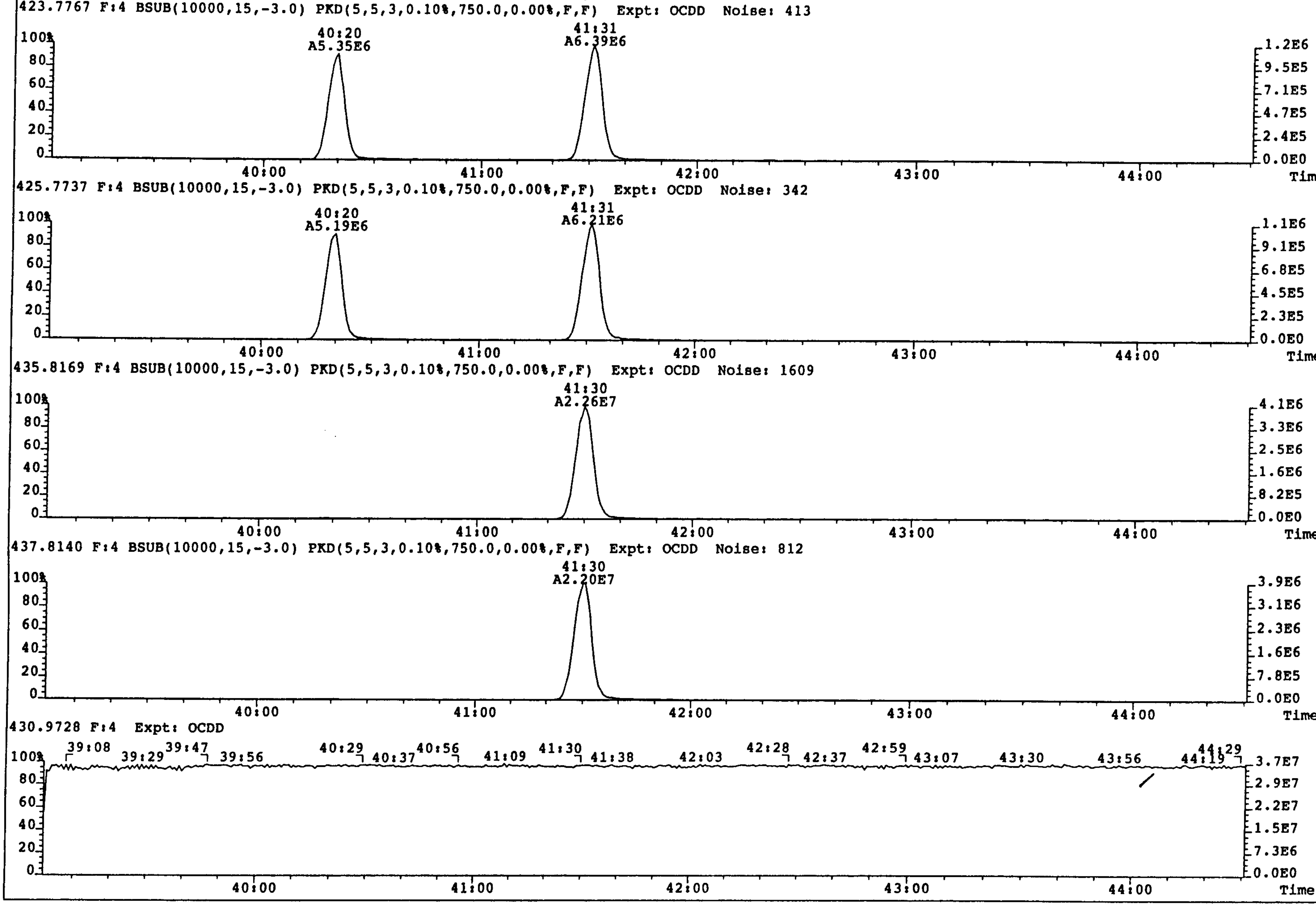


File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

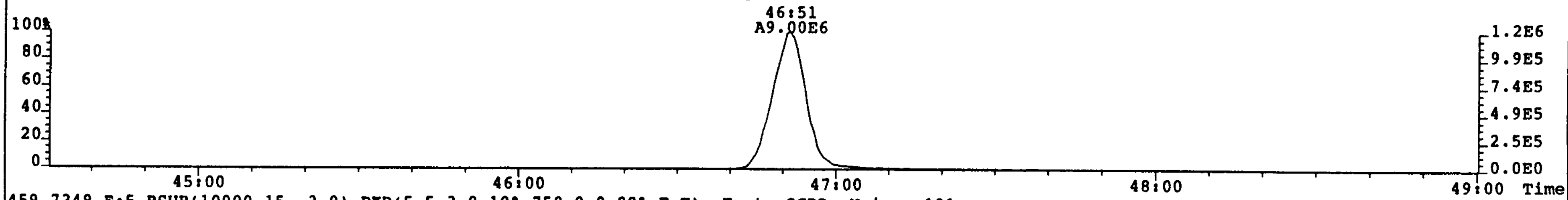



File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
389.8156 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 511
35:24 A7.91E5
37:06 A7.78E6
37:32 A7.65E6
391.8127 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 293
35:24 A6.27E5
37:06 A6.21E6
37:32 A6.10E6
401.8559 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 441
37:12 A2.69E7
37:31 A2.95E7
403.8530 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 204
37:05 A1.97E7
37:31 A2.39E7
380.9760 F:3 Expt: OCDD
34:28 35:11 35:22 35:43 35:58 36:06 36:21 36:32 36:50 37:01 37:15 37:34 37:41 38:03 38:24 38:46
100% 80 60 40 20 0
2.1E6 1.7E6 1.3E6 8.3E5 4.2E5 0.0E0
1.7E6 1.3E6 1.0E6 6.7E5 3.3E5 0.0E0
7.3E6 5.8E6 4.4E6 2.9E6 1.5E6 0.0E0
6.0E6 4.8E6 3.6E6 2.4E6 1.2E6 0.0E0
5.5E7 4.4E7 3.3E7 2.2E7 1.1E7 0.0E0
35:00 36:00 37:00 38:00 39:00 Time

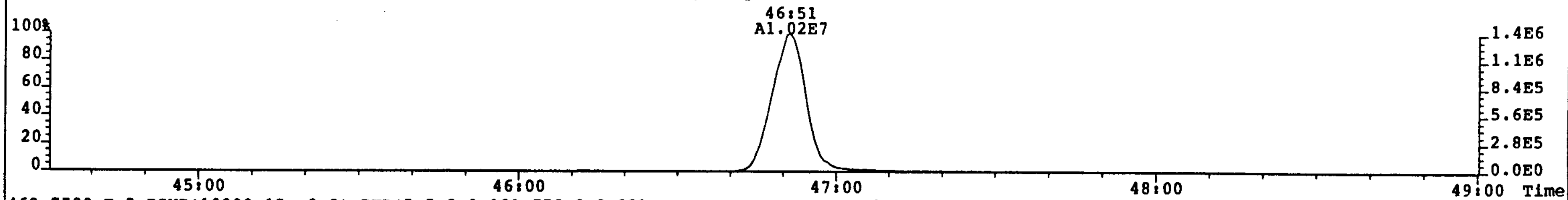
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



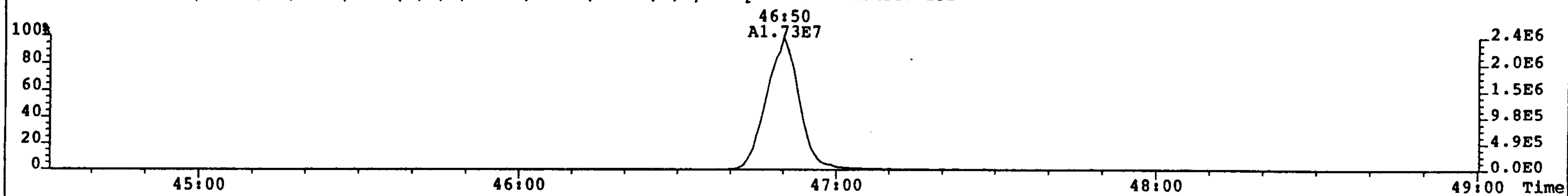
File: 010214P1  Acq: 14-FEB-2001 11:05:47  GC EI+ Voltage SIR  Autospec-UltimaE
Sample# 1  Text: DB5 CPSM / M23 CS3  Vial# 3  File Text: AAP DB5
457.7377 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 437



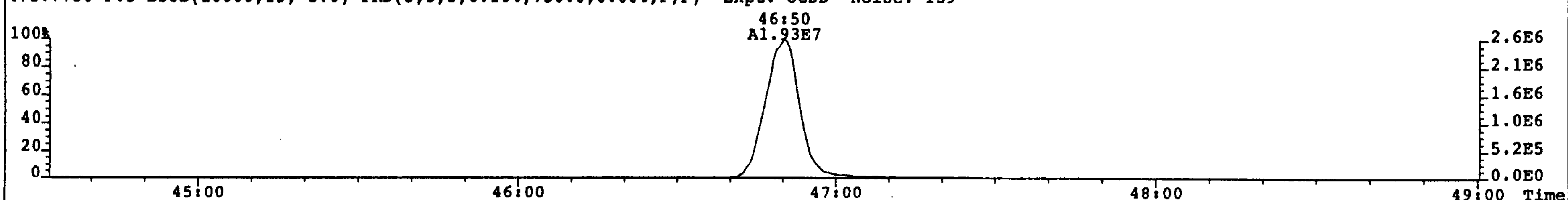

459.7348 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 191



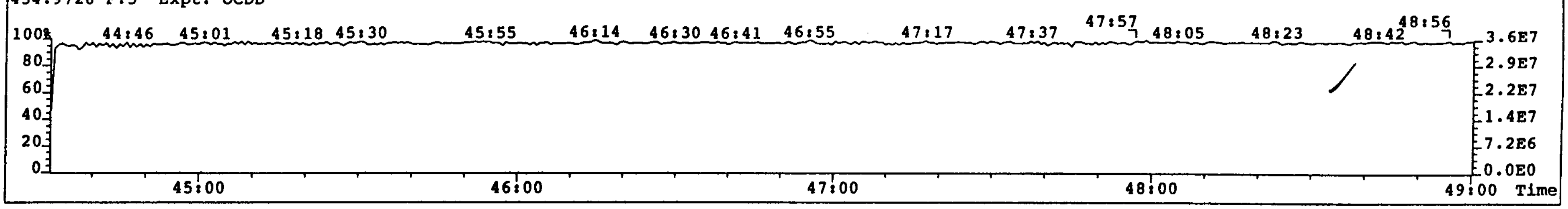

469.7780 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 152



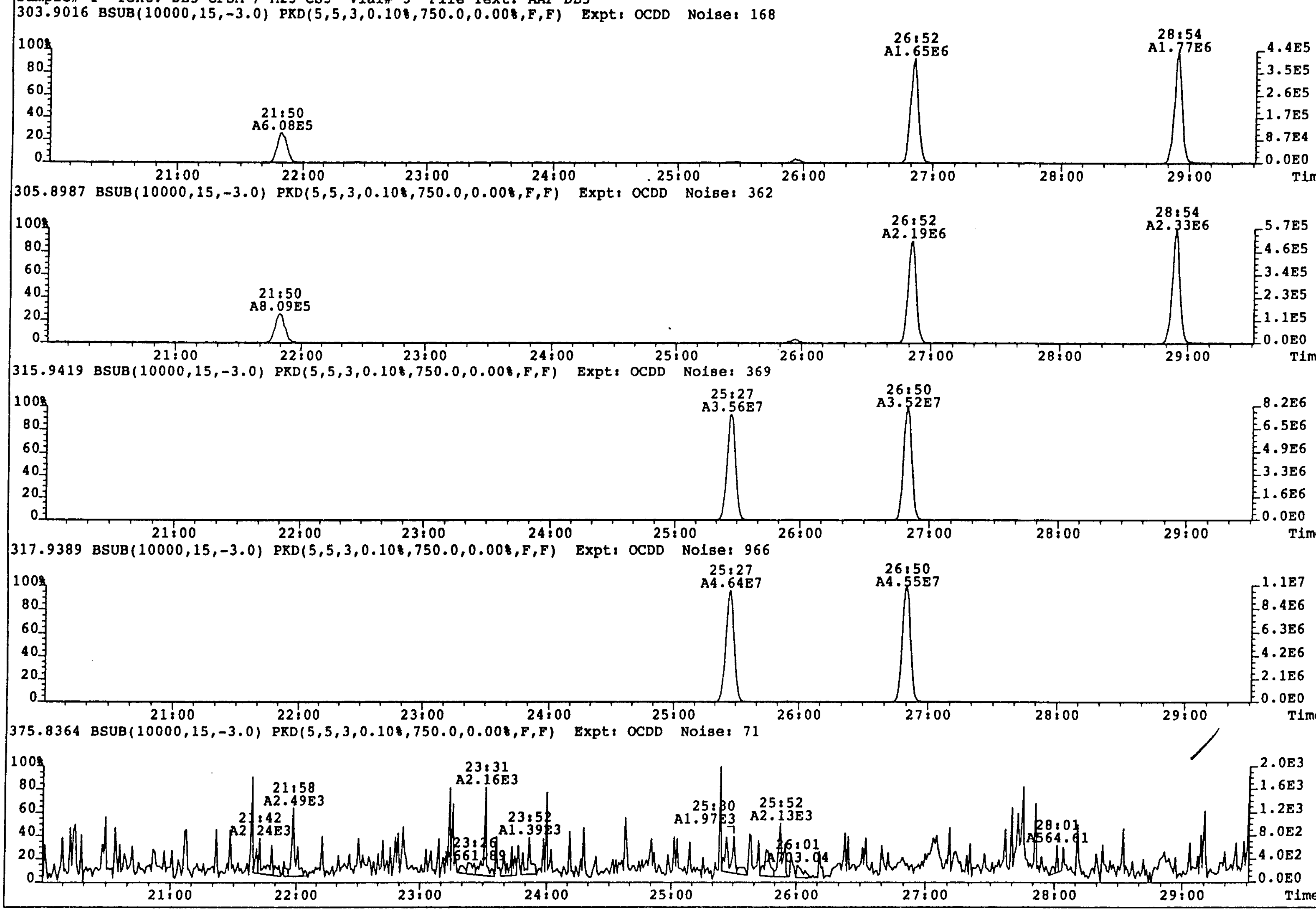

471.7750 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 139



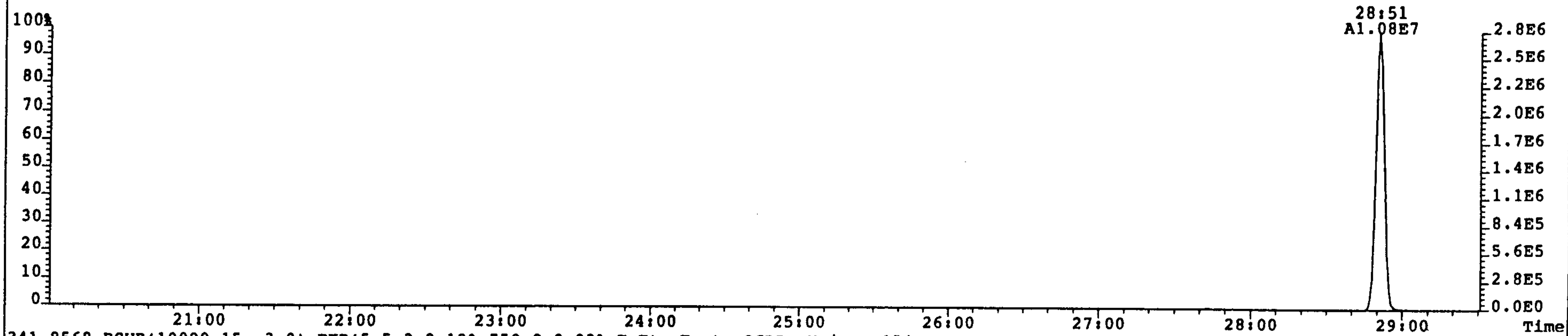

454.9728 F:5  Expt: OCDD



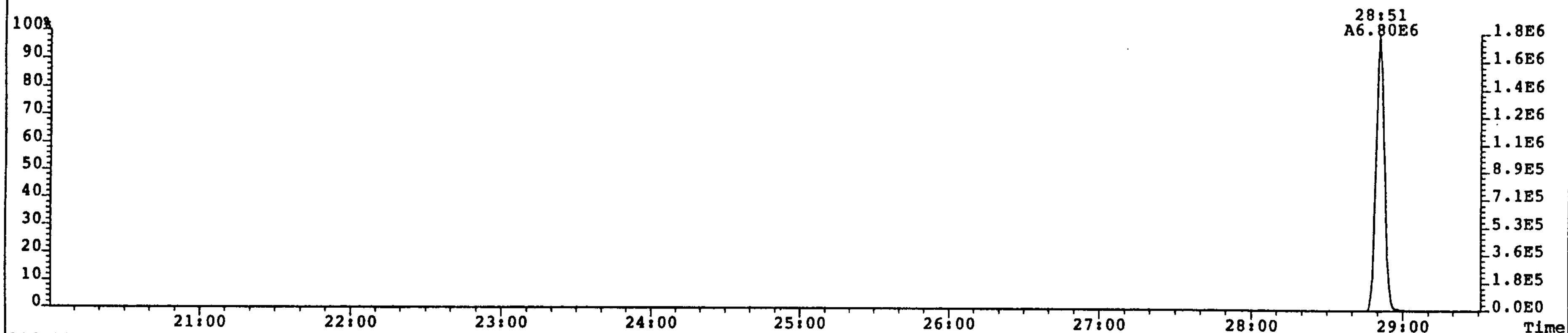
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



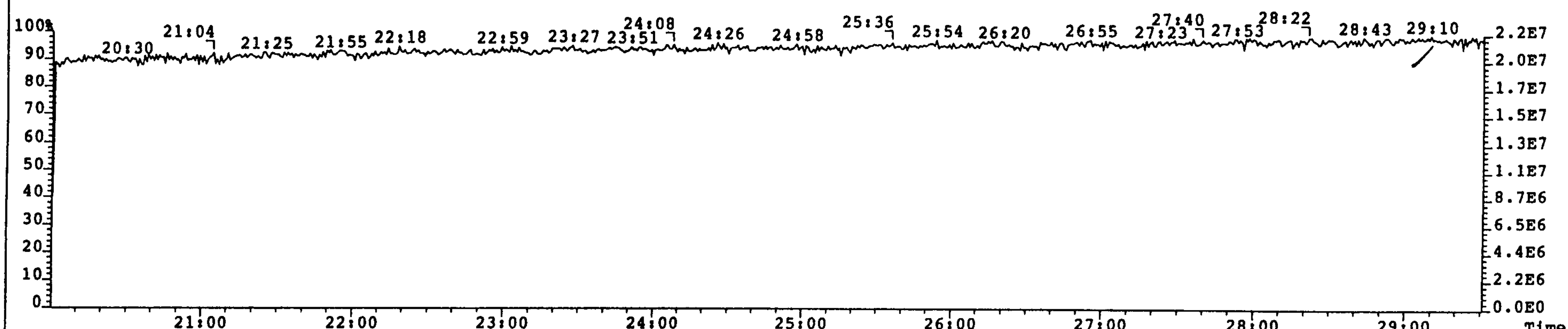
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 67



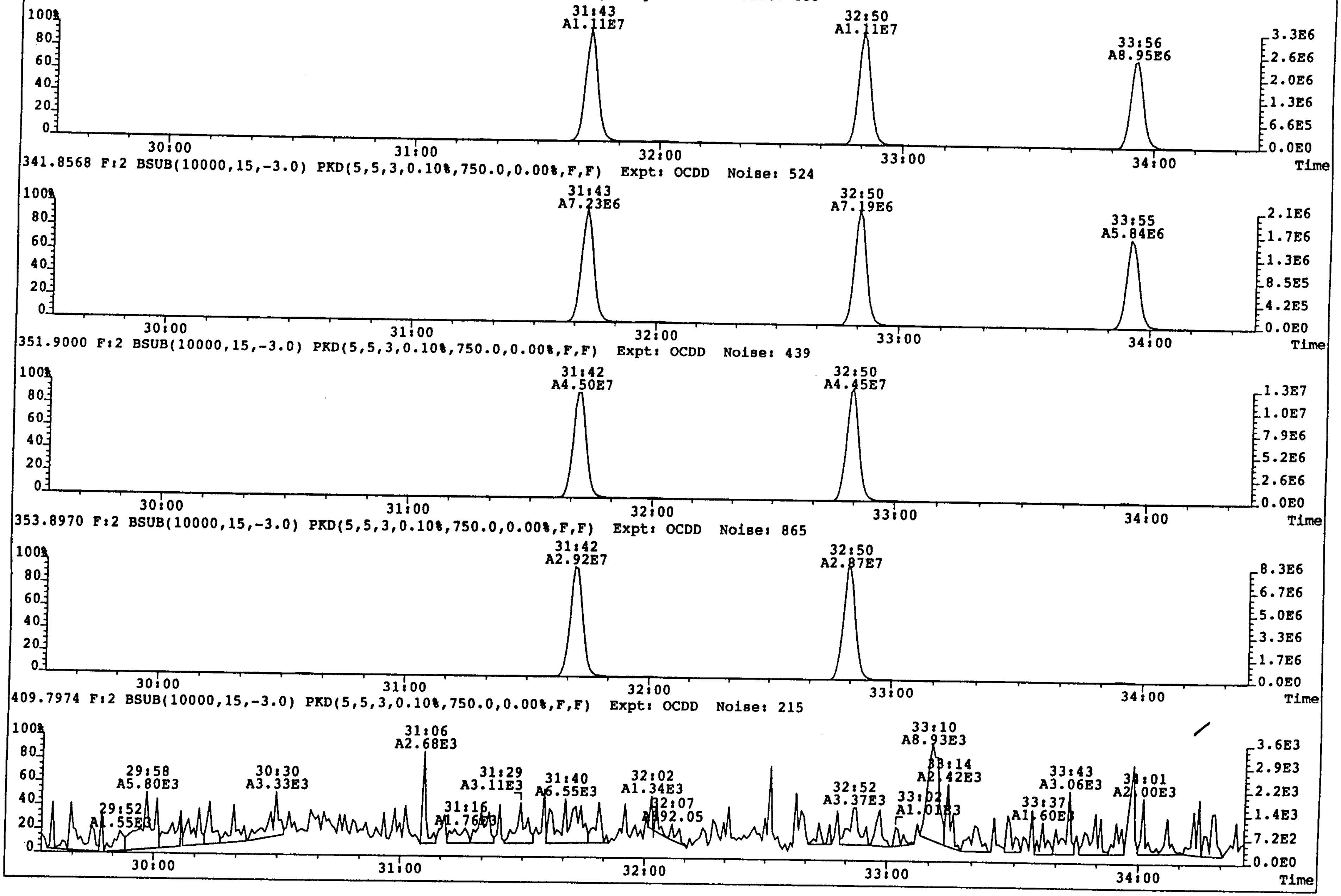

341.8568 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 154

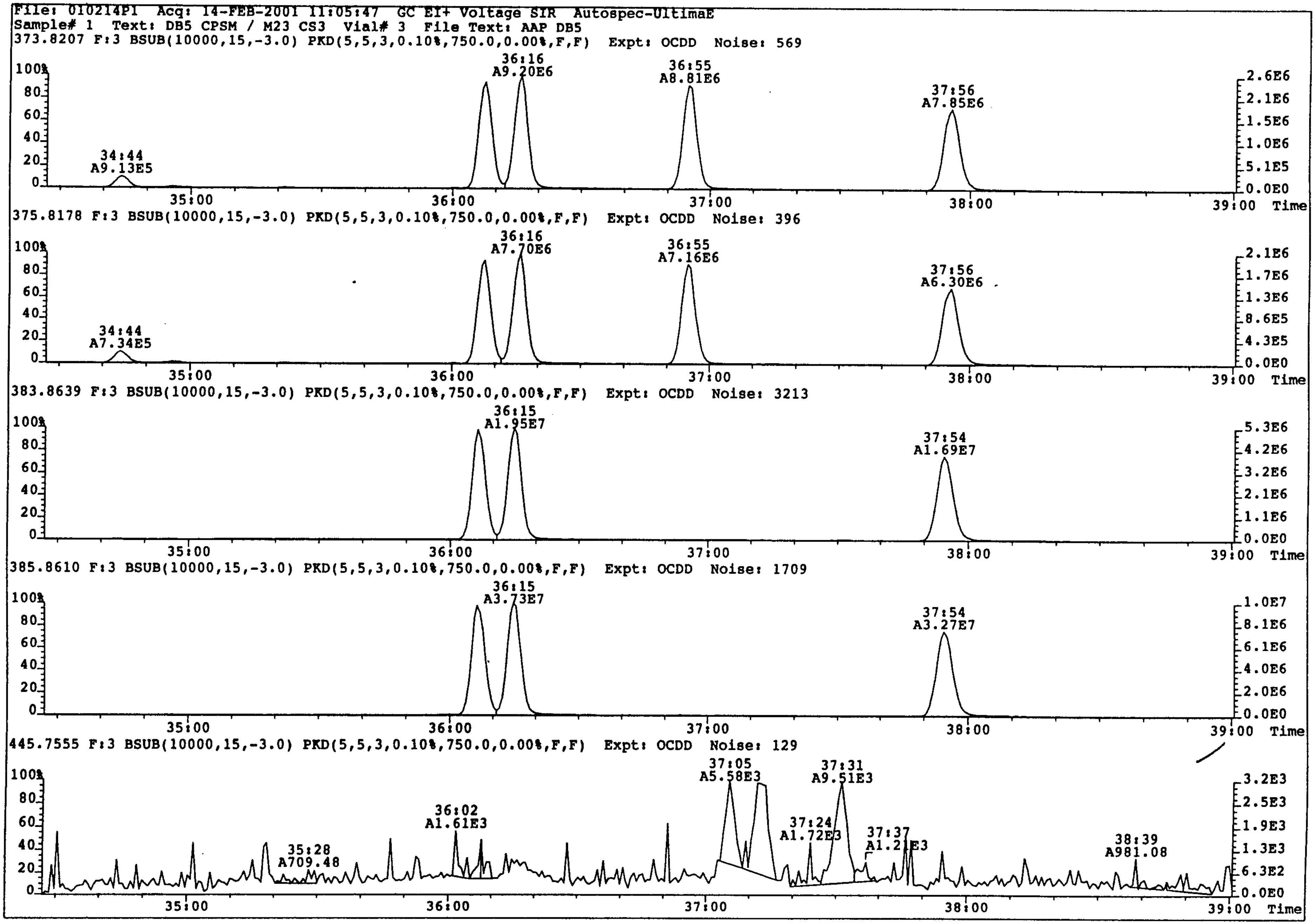



316.9824 Expt: OCDD

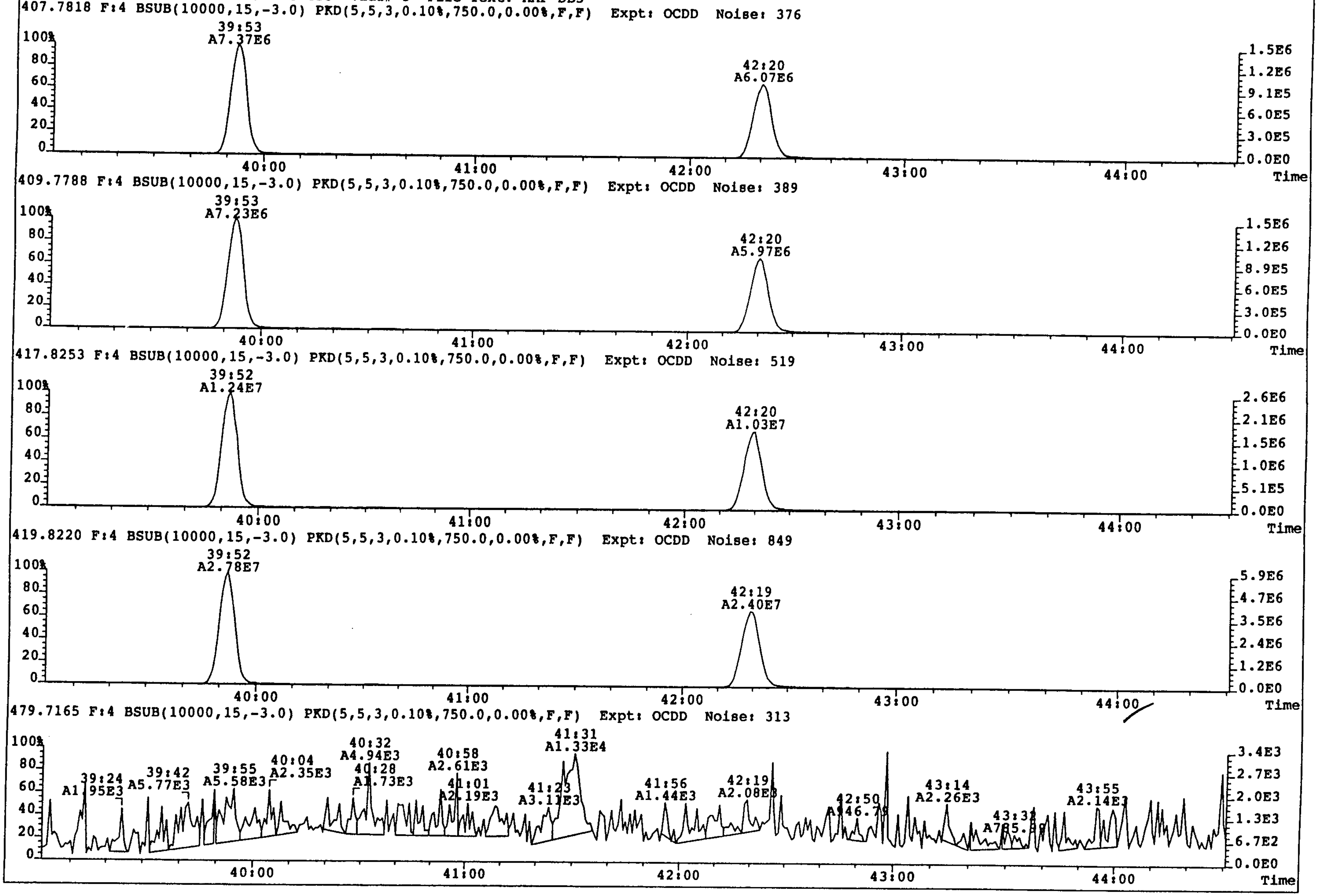


File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 468



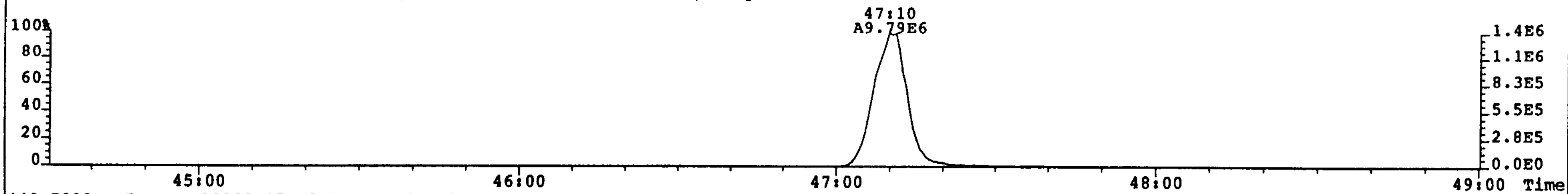

File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
373.8207 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 569
34:44 A9.13E5
36:16 A9.20E6
36:55 A8.81E6
37:56 A7.85E6
375.8178 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 396
34:44 A7.34E5
36:16 A7.70E6
36:55 A7.16E6
37:56 A6.30E6
383.8639 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 3213
36:15 A1.95E7
37:54 A1.69E7
385.8610 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1709
36:15 A3.73E7
37:54 A3.27E7
445.7555 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 129
35:28 A709.48
36:02 A1.61E3
37:05 A5.58E3
37:24 A1.72E3
37:31 A9.51E3
37:37 A1.21E3
38:39 A981.08
35:00
36:00
37:00
38:00
39:00 Time

File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

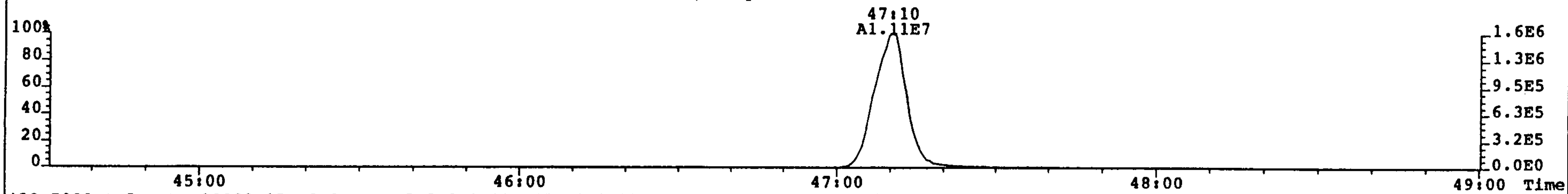


File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

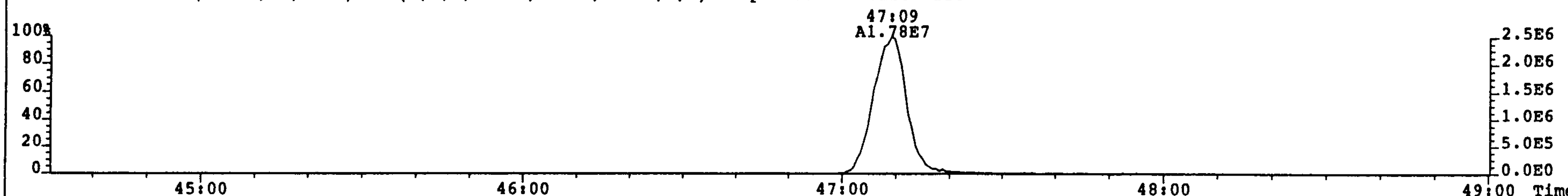
441.7428 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 181



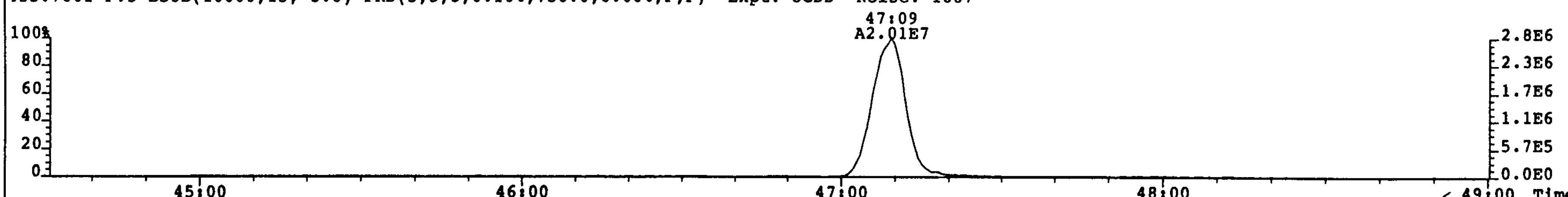

443.7398 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 273




453.7830 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 114




455.7801 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1887




513.6775 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 94

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#7 Analysis Date: 14-FEB-01 Time: 16:16:11

Reviewer: ce

Date: 24 Feb Ø1

| NATIVE ANALYTES | M/Z'S FORMING RATIO | ION ABUND. RATIO | QC LIMITS | Pass | CONC. FOUND | CONC. RANGE (ng/mL) |
|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | M/M+2 | 0.78 | 0.65-0.89 | y | 5.20 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDD | M+2/M+4 | 1.52 | 1.32-1.78 | y | 26.07 | 18.75-31.25 |
| 1,2,3,4,7,8-HxCDD | M+2/M+4 | 1.25 | 1.05-1.43 | y | 25.54 | 18.75-31.25 |
| 1,2,3,6,7,8-HxCDD | M+2/M+4 | 1.27 | 1.05-1.43 | y | 25.48 | 18.75-31.25 |
| 1,2,3,7,8,9-HxCDD | M+2/M+4 | 1.21 | 1.05-1.43 | y | 25.82 | 18.75-31.25 |
| 1,2,3,4,6,7,8-HpCDD | M+2/M+4 | 1.03 | 0.88-1.20 | y | 24.53 | 18.75-31.25 |
| OCDD | M+2/M+4 | 0.88 | 0.76-1.02 | y | 50.91 | 37 - 65 |
| 2,3,7,8-TCDF | M/M+2 | 0.76 | 0.65-0.89 | y | 4.50 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDF | M+2/M+4 | 1.53 | 1.32-1.78 | y | 23.69 | 18.75-31.25 |
| 2,3,4,7,8-PeCDF | M+2/M+4 | 1.52 | 1.32-1.78 | y | 23.63 | 18.75-31.25 |
| 1,2,3,4,7,8-HxCDF | M+2/M+4 | 1.22 | 1.05-1.43 | y | 24.61 | 18.75-31.25 |
| 1,2,3,6,7,8-HxCDF | M+2/M+4 | 1.22 | 1.05-1.43 | y | 24.34 | 18.75-31.25 |
| 2,3,4,6,7,8-HxCDF | M+2/M+4 | 1.21 | 1.05-1.43 | y | 24.75 | 18.75-31.25 |
| 1,2,3,7,8,9-HxCDF | M+2/M+4 | 1.22 | 1.05-1.43 | y | 24.73 | 18.75-31.25 |
| 1,2,3,4,6,7,8-HpCDF | M+2/M+4 | 1.02 | 0.88-1.20 | y | 23.58 | 18.75-31.25 |
| 1,2,3,4,7,8,9-HpCDF | M+2/M+4 | 1.01 | 0.88-1.20 | y | 23.65 | 18.75-31.25 |
| OCDF | M+2/M+4 | 0.88 | 0.76-1.02 | y | 47.75 | 35 - 65 |

Analyst: GAG

Date: 20 Feb01

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: Ce

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#7 Analysis Date: 14-FEB-01 Time: 16:16:11

| LABELED COMPOUNDS | M/Z'S FORMING RATIO | ION ABUND. RATIO | QC LIMITS | Pass | CONC. FOUND | CONC. RANGE (ng/mL) |
|---|---|---|---|---|---|---|
| 13C-2,3,7,8-TCDD | M/M+2 | 0.79 | 0.65-0.89 | y | 95.8 | 70.0 - 130.0 |
| 13C-1,2,3,7,8-PeCDD | M+2/M+4 | 1.55 | 1.32-1.78 | y | 99.7 | 70.0 - 130.0 |
| 13C-1,2,3,6,7,8-HxCDD | M+2/M+4 | 1.26 | 1.05-1.43 | y | 91.9 | 70.0 - 130.0 |
| 13C-1,2,3,4,6,7,8-HpCDD | M+2/M+4 | 1.04 | 0.88-1.20 | y | 94.5 | 70.0 - 130.0 |
| 13C-OCDD | M+2/M+4 | 0.90 | 0.76-1.02 | y | 95.8 | 70.0 - 130.0 |
| 13C-2,3,7,8-TCDF | M/M+2 | 0.77 | 0.65-0.89 | y | 92.1 | 70.0 - 130.0 |
| 13C-1,2,3,7,8-PeCDF | M+2/M+4 | 1.55 | 1.32-1.78 | y | 92.4 | 70.0 - 130.0 |
| 13C-1,2,3,6,7,8-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 80.4 | 70.0 - 130.0 |
| 13C-1,2,3,4,6,7,8-HpCDF | M/M+2 | 0.44 | 0.37-0.51 | y | 82.3 | 70.0 - 130.0 |
| 13C-OCDF | M+2/M+4 | 0.89 | 0.76-1.02 | y | 89.4 | 70.0 - 130.0 |
| 37Cl-2,3,7,8-TCDD | | | | | 102.4 | 75.0 - 125.0 |
| 13C-2,3,4,7,8-PeCDF | M+2/M+4 | 1.56 | 1.32-1.78 | y | 103.1 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8-HxCDD | M+2/M+4 | 1.25 | 1.05-1.43 | y | 105.1 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8-HxCDF | M/M+2 | 0.51 | 0.43-0.59 | y | 106.5 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8,9-HpCDF | M/M+2 | 0.44 | 0.37-0.51 | y | 105.2 | 75.0 - 125.0 |
| 13C-1,2,3,7,8,9-HxCDF | M/M+2 | 0.51 | 0.43-0.59 | y | 88.0 | 75.0 - 125.0 |

Analyst: GAG

Date: 20 Feb 01

Client ID: DB5 CPSM / M23 CS3
Lab ID: CS3RC

Filename: 010214P1 S: 7 Acq: 14-FEB-01 16:16:11
GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000

ConCal: 010214P1-
EndCal: 010214P1-

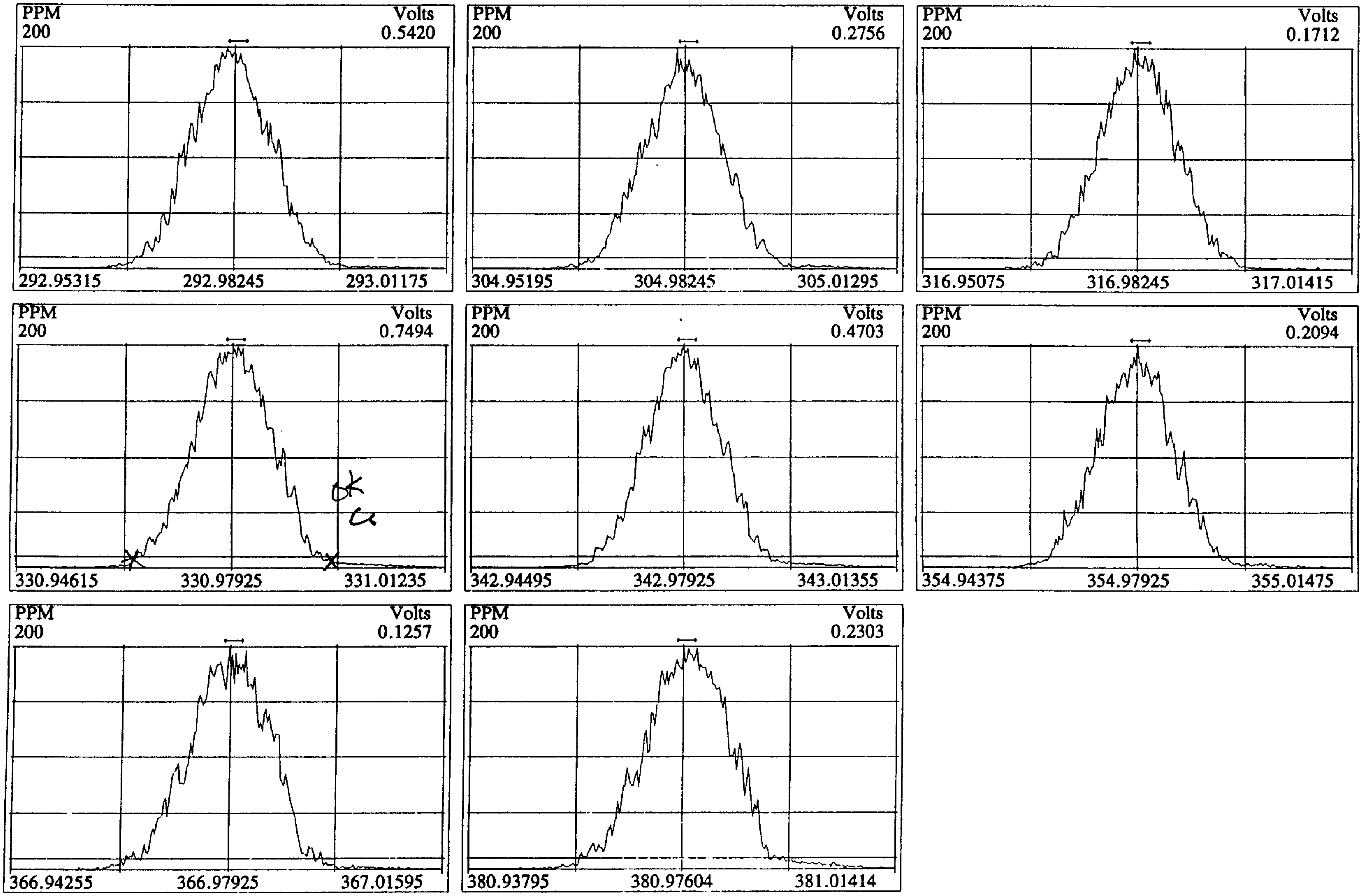


Reviewer: CL
Date: 24 Feb 01

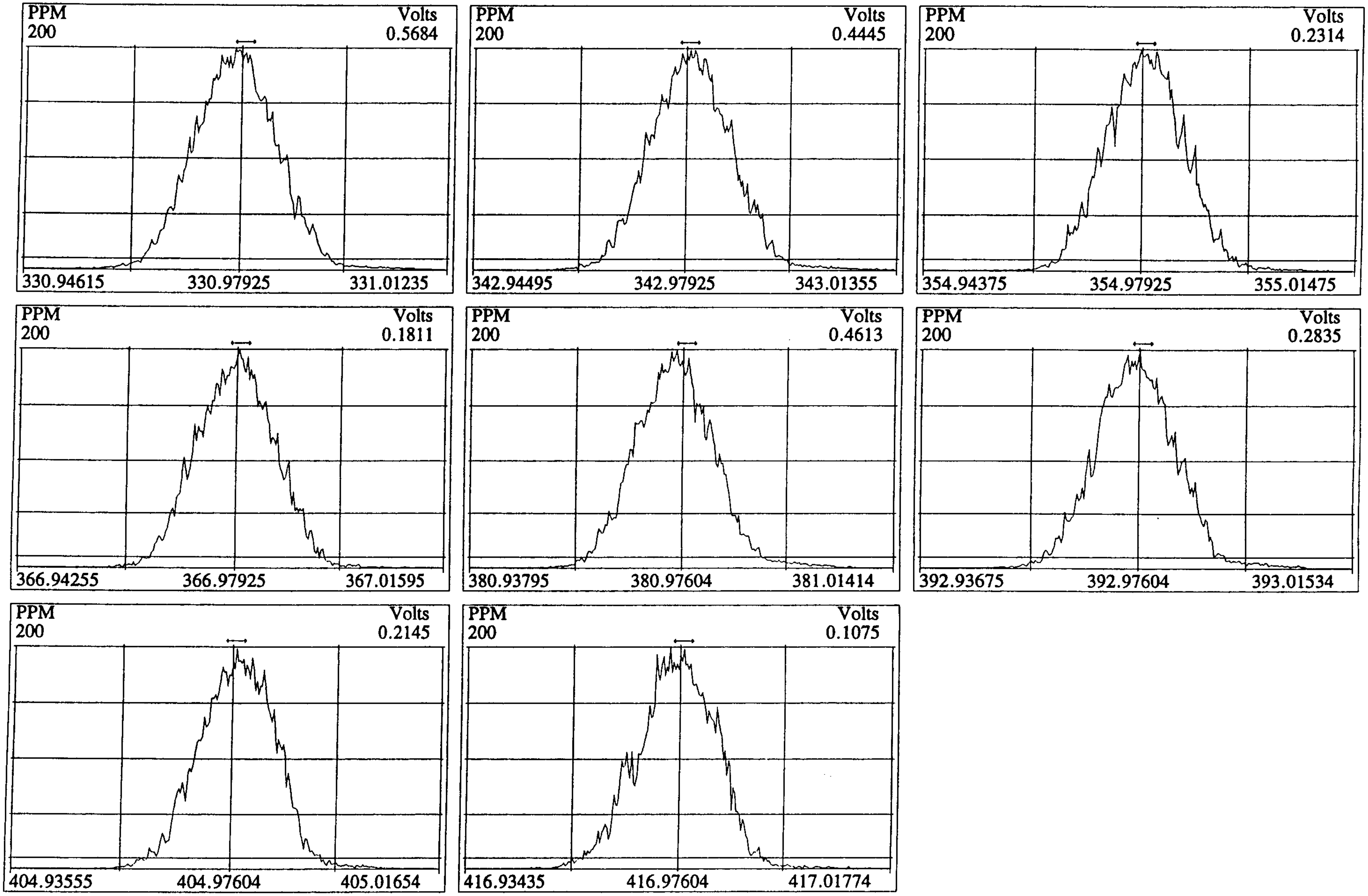
| | Name | Resp | RA | RRF | RT | Conc | Qualif. | CDE | noise | Fac | DL | EMPC | Rec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2,3,7,8-TCDD | 4.10e+06 | 0.78 y | 1.26 | 27:44 | 5.20 | | | 793 | 2.5 | 0.0176 | | |
| | 1,2,3,7,8-PeCDD | 1.40e+07 | 1.52 y | 1.01 | 33:11 | 26.1 | | | 726 | 2.5 | 0.0319 | | |
| | 1,2,3,4,7,8-HxCDD | 1.24e+07 | 1.25 y | 1.14 | 37:06 | 25.5 | | | 1945 | 2.5 | 0.0879 | | |
| | 1,2,3,6,7,8-HxCDD | 1.12e+07 | 1.27 y | 1.02 | 37:13 | 25.5 | | | 1945 | 2.5 | 0.0979 | | |
| | 1,2,3,7,8,9-HxCDD | 1.26e+07 | 1.21 y | 1.14 | 37:31 | 25.8 | | | 1945 | 2.5 | 0.0876 | | |
| | 1,2,3,4,6,7,8-HpCDD | 1.18e+07 | 1.03 y | 1.13 | 41:30 | 24.5 | | | 2277 | 2.5 | 0.152 | | |
| | OCDD | 1.83e+07 | 0.88 y | 1.03 | 46:50 | 50.9 | | | 827 | 2.5 | 0.0913 | | |
| | 2,3,7,8-TCDF | 3.57e+06 | 0.76 y | 1.05 | 26:51 | 4.50 | | | 1398 | 2.5 | 0.0329 | | |
| | 1,2,3,7,8-PeCDF | 1.69e+07 | 1.53 y | 1.04 | 31:43 | 23.7 | | | 1286 | 2.5 | 0.0401 | | |
| | 2,3,4,7,8-PeCDF | 1.71e+07 | 1.52 y | 1.05 | 32:50 | 23.6 | | | 1286 | 2.5 | 0.0395 | | |
| | 1,2,3,4,7,8-HxCDF | 1.43e+07 | 1.22 y | 1.13 | 36:07 | 24.6 | | | 3321 | 2.5 | 0.0818 | | |
| | 1,2,3,6,7,8-HxCDF | 1.55e+07 | 1.22 y | 1.24 | 36:15 | 24.3 | | | 3321 | 2.5 | 0.0748 | | |
| | 2,3,4,6,7,8-HxCDF | 1.48e+07 | 1.21 y | 1.16 | 36:55 | 24.7 | | | 3321 | 2.5 | 0.0795 | | |
| | 1,2,3,7,8,9-HxCDF | 1.29e+07 | 1.22 y | 1.02 | 37:55 | 24.7 | | | 3321 | 2.5 | 0.0909 | | |
| | 1,2,3,4,6,7,8-HpCDF | 1.35e+07 | 1.02 y | 1.54 | 39:52 | 23.6 | | | 3009 | 2.5 | 0.0948 | | |
| | 1,2,3,4,7,8,9-HpCDF | 1.14e+07 | 1.01 y | 1.30 | 42:20 | 23.6 | | | 3009 | 2.5 | 0.113 | | |
| | OCDF | 1.98e+07 | 0.88 y | 1.15 | 47:09 | 47.8 | | | 1658 | 2.5 | 0.144 | | |
| | Total Tetra-Dioxins | 1.64e+07 | 0.77 y | 1.26 | 23:60 | 20.8 | | | 793 | 2.5 | 0.0176 | 20.9 | |
| | Total Penta-Dioxins | 3.71e+07 | 1.54 y | 1.01 | 30:39 | 69.0 | | | 726 | 2.5 | 0.0319 | 69.2 | |
| | Total Hexa-Dioxins | 3.75e+07 | 1.31 y | 1.10 | 35:23 | 79.6 | | | 1945 | 2.5 | 0.0909 | 80.1 | |
| | Total Hepta-Dioxins | 2.18e+07 | 1.01 y | 1.13 | 40:19 | 45.3 | | | 2277 | 2.5 | 0.152 | 45.7 | |
| | Total Tetra-Furans | 9.06e+06 | 0.77 y | 1.05 | 21:50 | 11.4 | | | 1398 | 2.5 | 0.0329 | 11.6 | |
| | 1st Fnc. Penta-Furans | 1.66e+07 | 1.58 y | 1.05 | 28:51 | 23.1 | | | 2814 | 2.5 | 0.0872 | 23.2 | |
| | Total Penta-Furans | 4.81e+07 | 1.53 y | 1.05 | 31:43 | 66.9 | | | 1286 | 2.5 | 0.0398 | | |
| | PeCDF Totals: | | | | | 90.0 | | | | | | 90.3 | |
| | Total Hexa-Furans | 5.94e+07 | 1.22 y | 1.14 | 34:44 | 102 | | | 3321 | 2.5 | 0.0813 | 102 | |
| | Total Hepta-Furans | 2.49e+07 | 1.02 y | 1.42 | 39:52 | 47.3 | | | 3009 | 2.5 | 0.103 | 47.6 | |
| IS | 13C-2,3,7,8-TCDD | 6.26e+07 | 0.79 y | 1.13 | 27:43 | 95.8 | | | | | | | 95.8 |
| IS | 13C-1,2,3,7,8-PeCDD | 5.32e+07 | 1.55 y | 0.93 | 33:10 | 99.7 | | | | | | | 99.7 |
| IS | 13C-1,2,3,6,7,8-HxCDD | 4.28e+07 | 1.26 y | 0.93 | 37:12 | 91.9 | | | | | | | 91.9 |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.27e+07 | 1.04 y | 0.91 | 41:29 | 94.5 | | | | | | | 94.5 |
| IS | 13C-OCDD | 3.50e+07 | 0.90 y | 0.73 | 46:49 | 95.8 | | | | | | | 95.8 |
| IS | 13C-2,3,7,8-TCDF | 7.58e+07 | 0.77 y | 1.06 | 26:49 | 92.1 | | | | | | | 92.1 |
| IS | 13C-1,2,3,7,8-PeCDF | 6.88e+07 | 1.55 y | 0.96 | 31:42 | 92.4 | | | | | | | 92.4 |
| IS | 13C-1,2,3,6,7,8-HxCDF | 5.14e+07 | 0.52 y | 1.28 | 36:14 | 80.4 | | | | | | | 80.4 |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 3.70e+07 | 0.44 y | 0.90 | 39:51 | 82.3 | | | | | | | 82.3 |
| IS | 13C-OCDF | 3.62e+07 | 0.89 y | 0.81 | 47:08 | 89.4 | | | | | | | 89.4 |
| RS/RT | 13C-1,2,3,4-TCDD | 5.76e+07 | 0.80 y | 1.00 | 27:03 | 100 | | | | | | | - |
| RS | 13C-1,2,3,4-TCDF | 7.76e+07 | 0.76 y | 1.00 | 25:26 | 100 | | | | | | | - |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD | 4.99e+07 | 1.24 y | 1.00 | 37:30 | 100 | | | | | | | - |
| PS | 37Cl-2,3,7,8-TCDD | 3.30e+07 | | 0.51 | 27:44 | 102 | | | | | | | 102 |
| PS | 13C-2,3,4,7,8-PeCDF | 6.90e+07 | 1.56 y | 0.97 | 32:49 | 103 | | | | | | | 103 |
| PS | 13C-1,2,3,4,7,8-HxCDD | 4.15e+07 | 1.25 y | 0.92 | 37:05 | 105 | | | | | | | 105 |
| PS | 13C-1,2,3,4,7,8-HxCDF | 4.98e+07 | 0.51 y | 0.91 | 36:06 | 106 | | | | | | | 106 |
| PS | 13C-1,2,3,4,7,8,9-HpCDF | 3.33e+07 | 0.44 y | 0.85 | 42:19 | 105 | | | | | | | 105 |
| AS | 13C-1,2,3,7,8,9-HxCDF | 4.69e+07 | 0.51 y | 1.07 | 37:54 | 88.0 | | | | | | | 88.0 |

Analyst: GAG
Date: 20Feb01

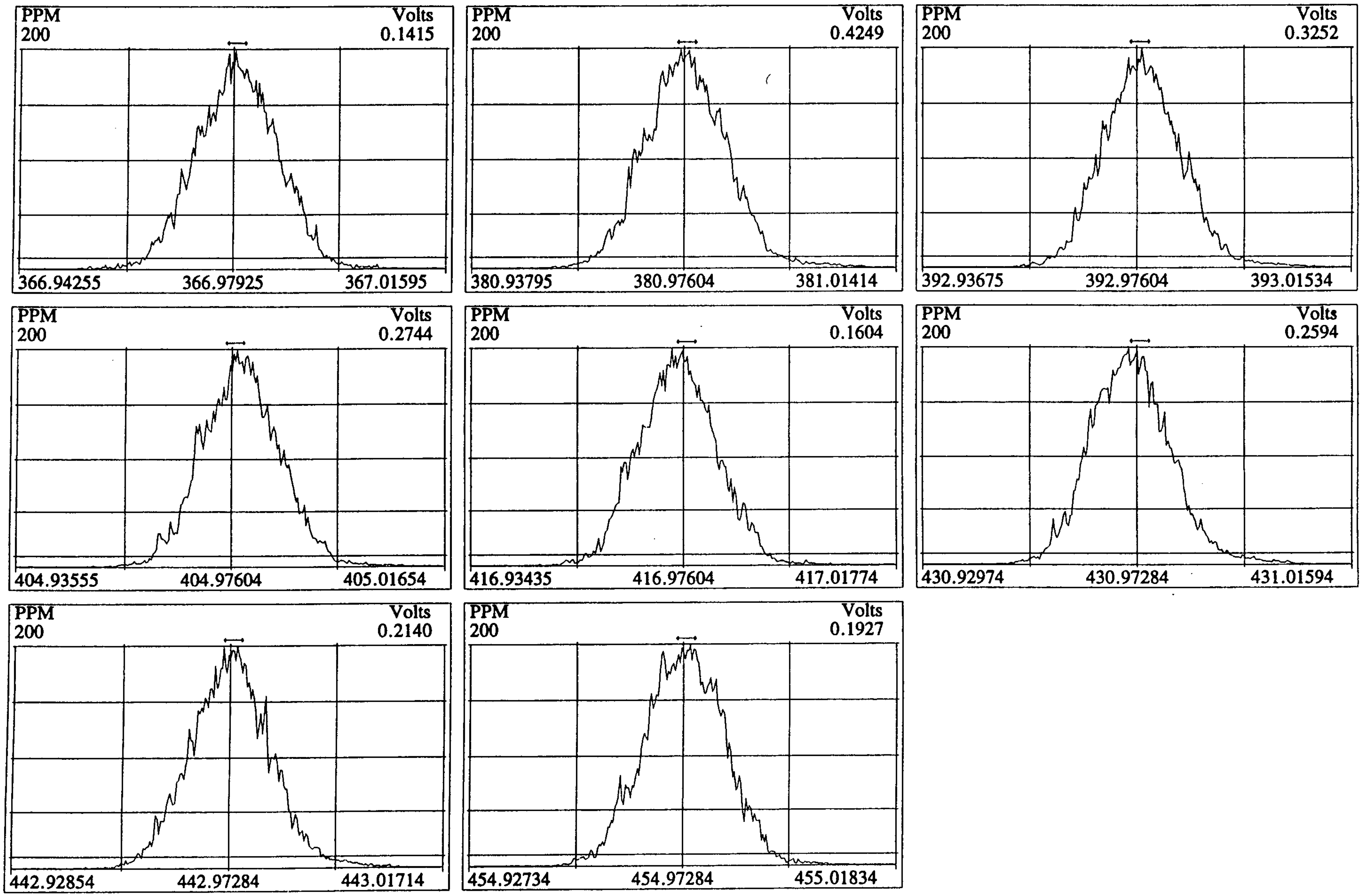
Peak Locate Examination:14-FEB-2001:17:12 File:RES_CHECK
Experiment:OCDD Function:1 Reference:PFK2



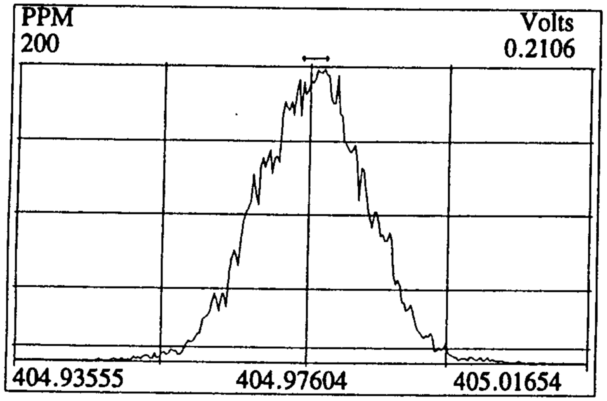
Peak Locate Examination:14-FEB-2001:17:13 File:RES_CHECK
Experiment:OCDD Function:2 Reference:PFK2

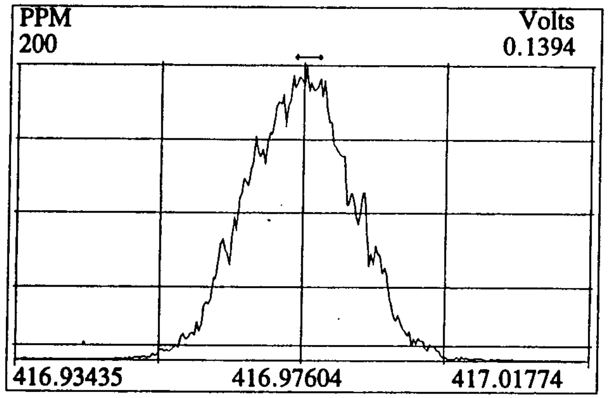


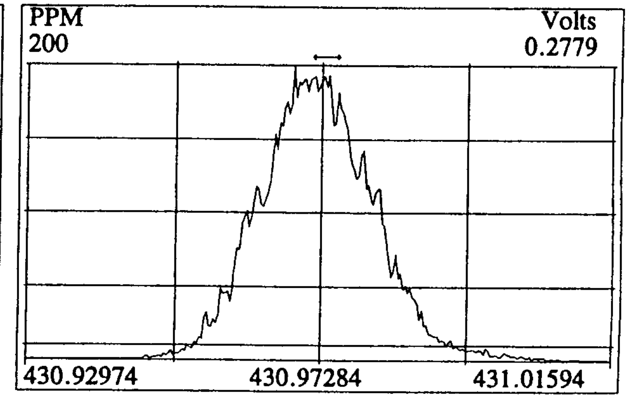
Peak Locate Examination:14-FEB-2001:17:14 File:RES_CHECK
Experiment:OCDD Function:3 Reference:PFK2

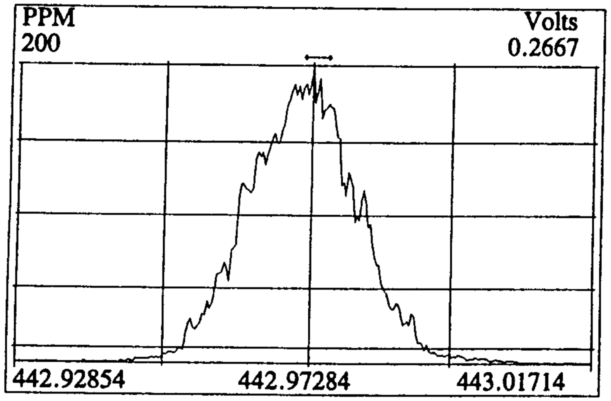


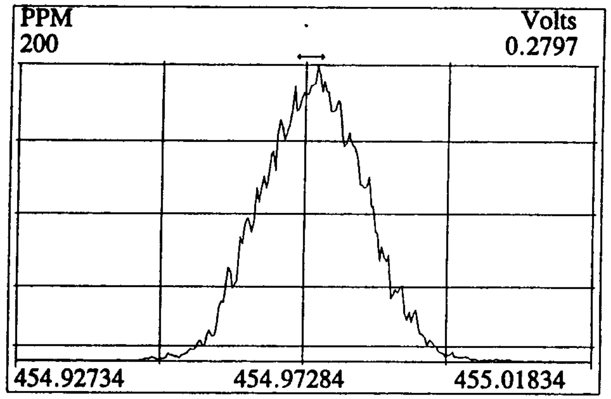
Peak Locate Examination:14-FEB-2001:17:15 File:RES_CHECK
Experiment:OCDD Function:4 Reference:PFK2

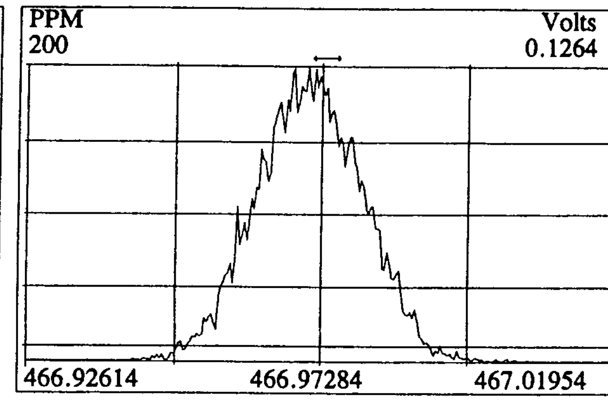


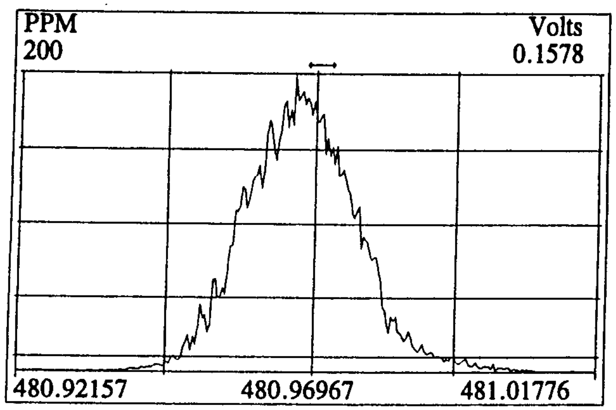



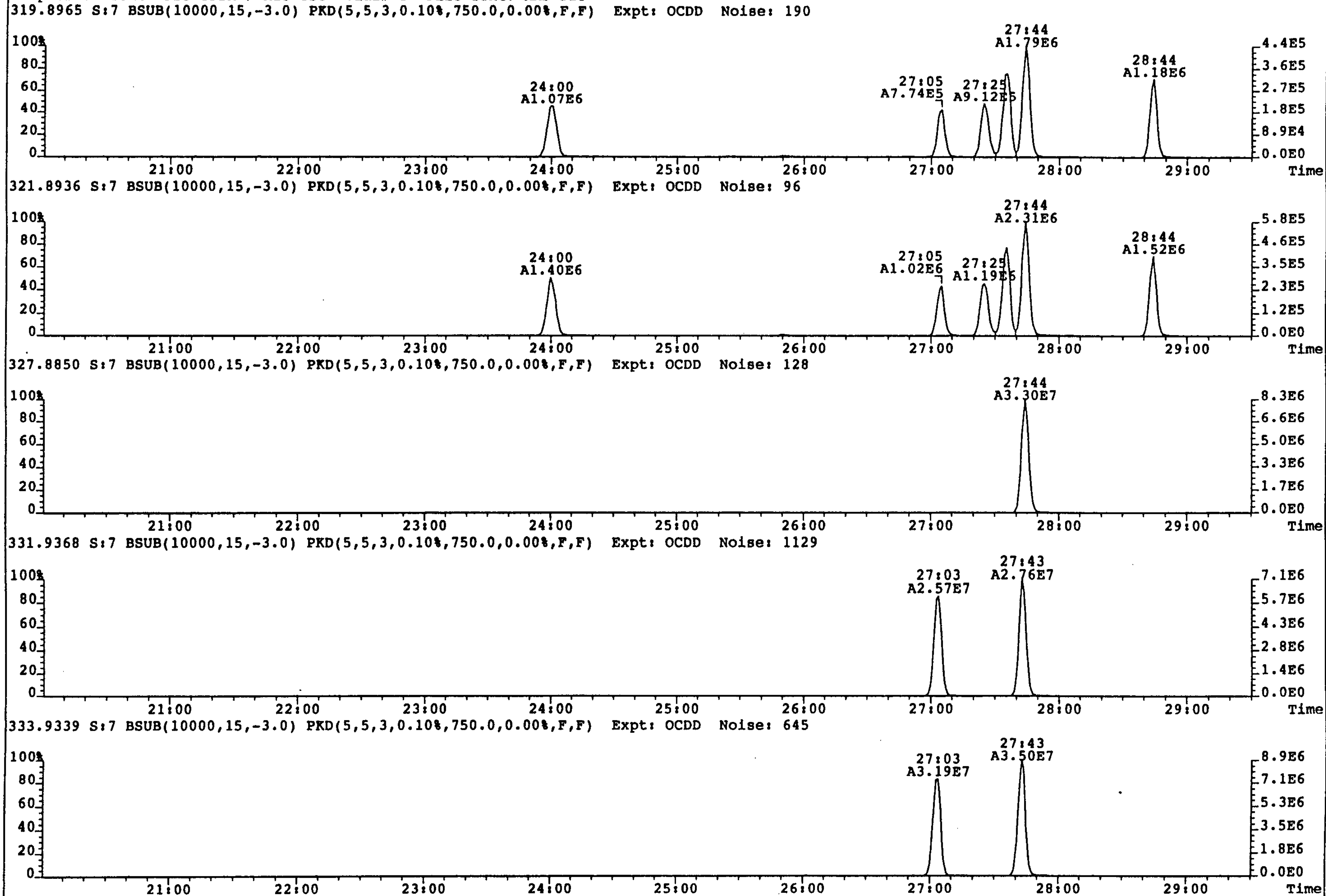



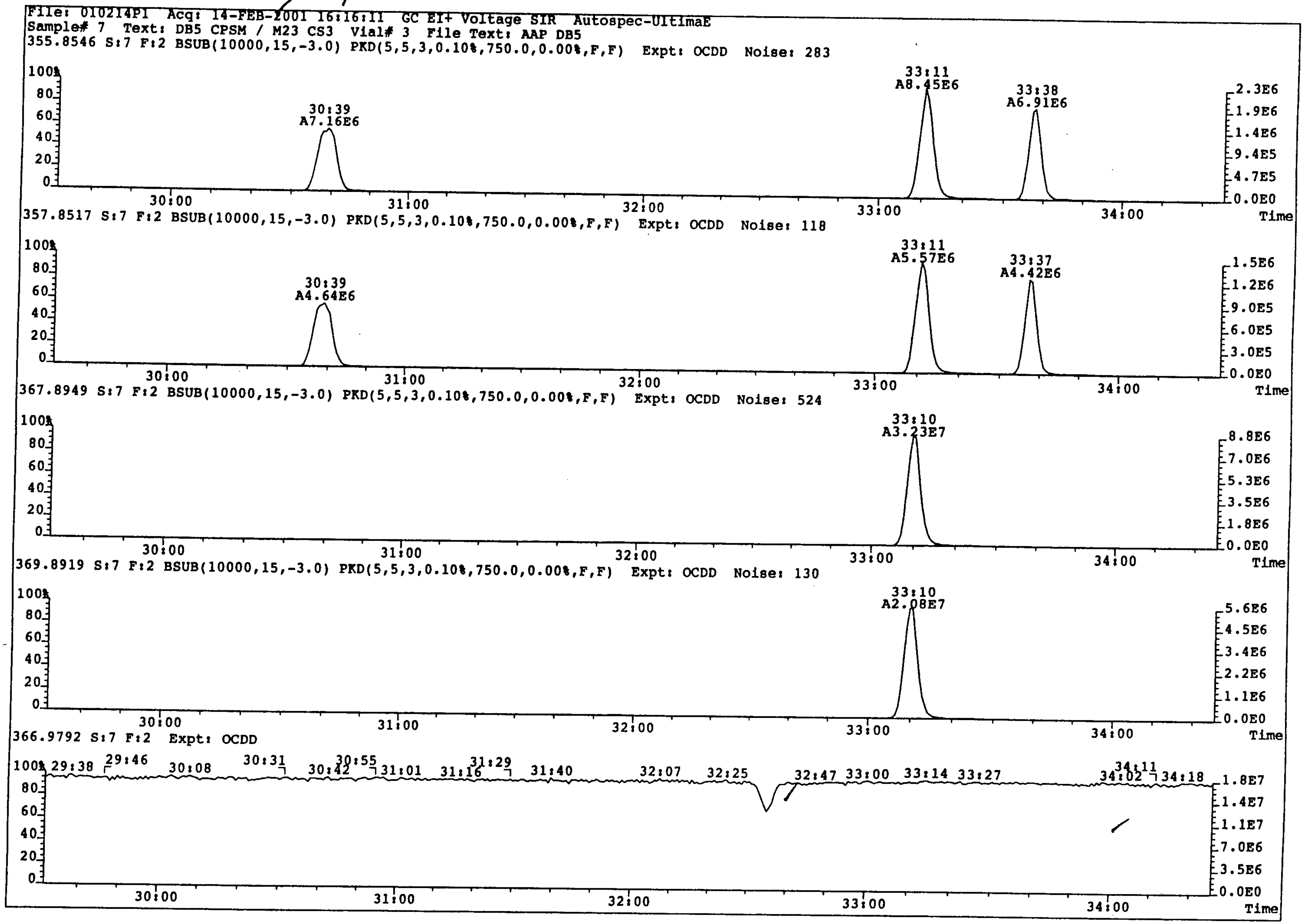



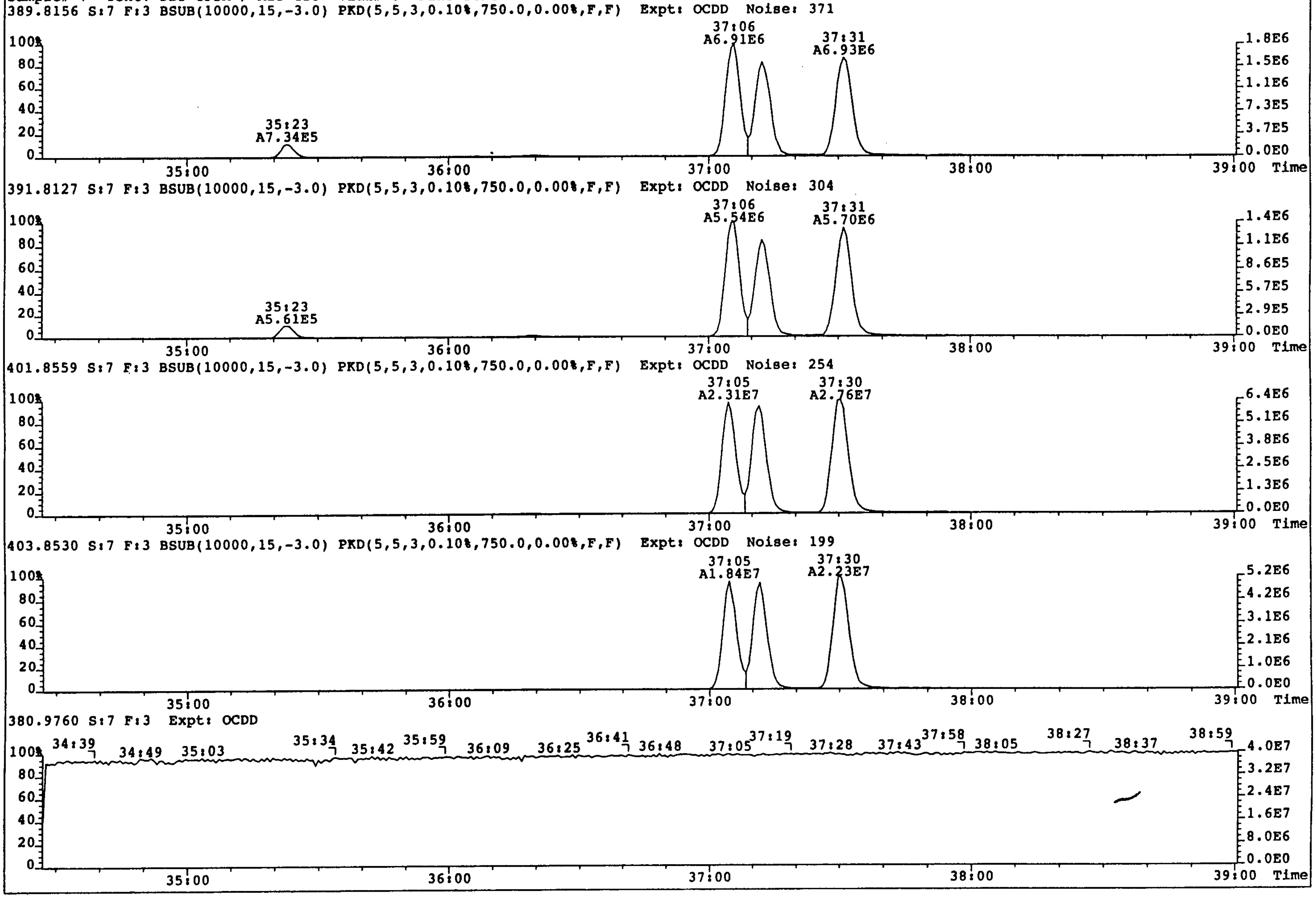



File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

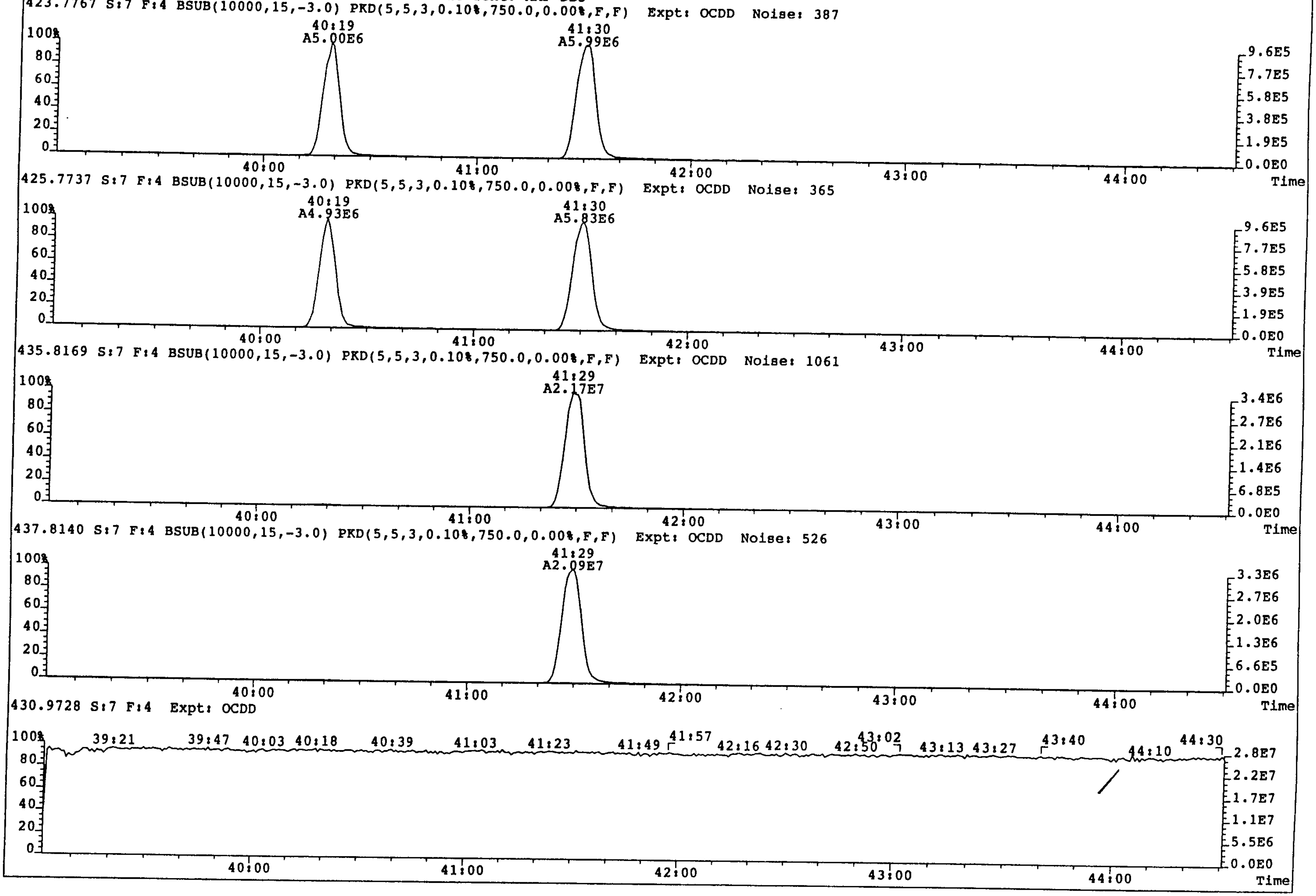



File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
355.8546 S:7 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 283
30:39 A7.16E6
33:11 A8.45E6
33:38 A6.91E6
2.3E6 1.9E6 1.4E6 9.4E5 4.7E5 0.0E0
357.8517 S:7 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 118
30:39 A4.64E6
33:11 A5.57E6
33:37 A4.42E6
1.5E6 1.2E6 9.0E5 6.0E5 3.0E5 0.0E0
367.8949 S:7 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 524
33:10 A3.23E7
8.8E6 7.0E6 5.3E6 3.5E6 1.8E6 0.0E0
369.8919 S:7 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 130
33:10 A2.08E7
5.6E6 4.5E6 3.4E6 2.2E6 1.1E6 0.0E0
366.9792 S:7 F:2 Expt: OCDD
29:38 29:46 30:08 30:31 30:42 30:55 31:01 31:16 31:29 31:40 32:07 32:25 32:47 33:00 33:14 33:27 34:02 34:11 34:18
1.8E7 1.4E7 1.1E7 7.0E6 3.5E6 0.0E0
100% 80 60 40 20 0
30:00 31:00 32:00 33:00 34:00
Time

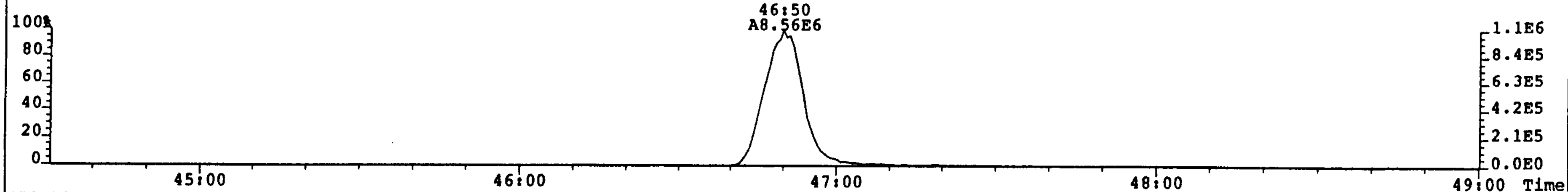
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



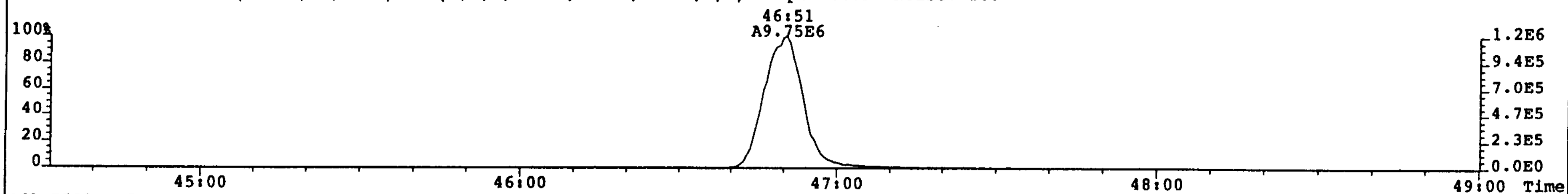
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



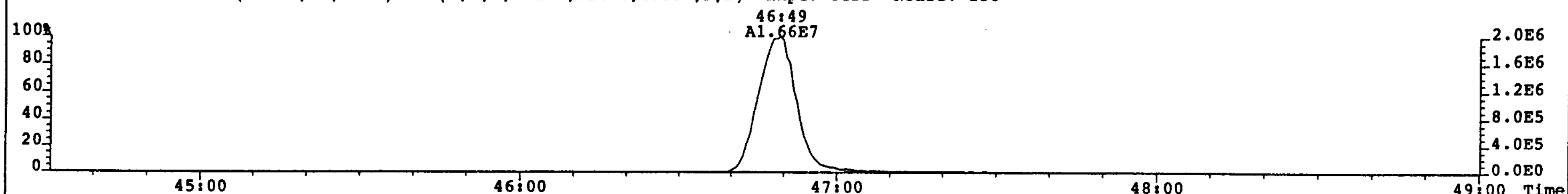
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
457.7377 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 312



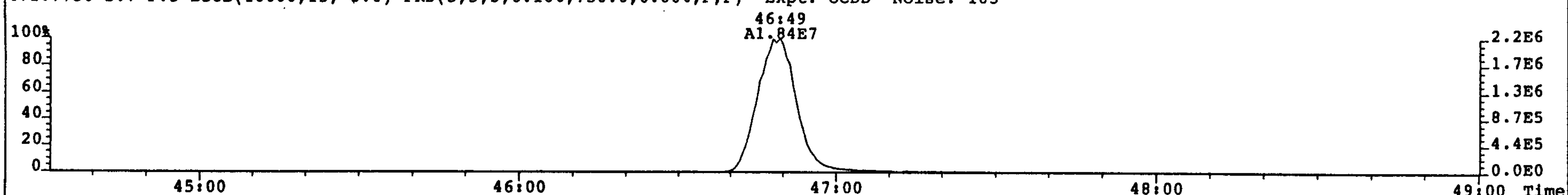

459.7348 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 160



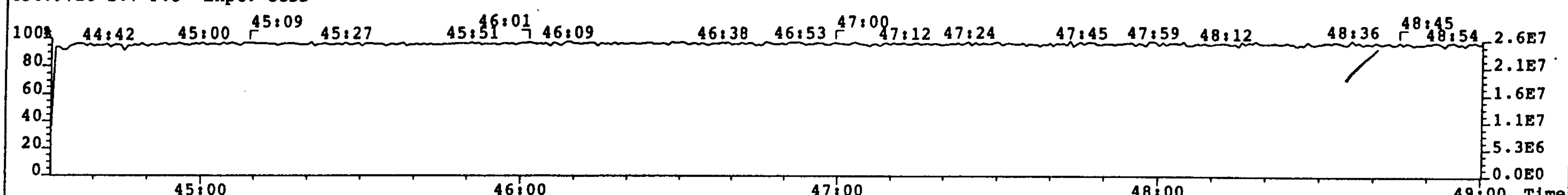

469.7780 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 130




471.7750 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 105

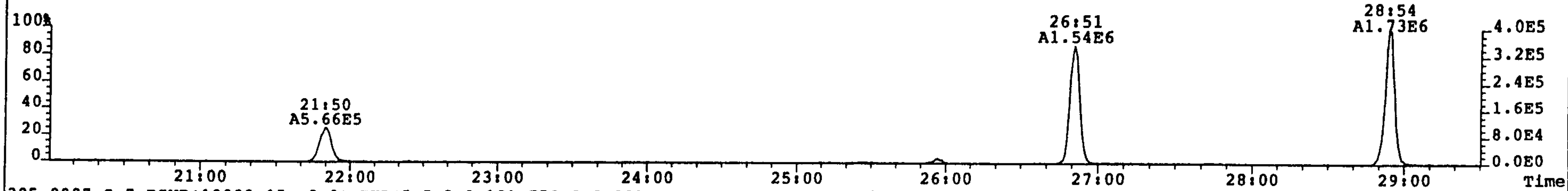



454.9728 S:7 F:5 Expt: OCDD

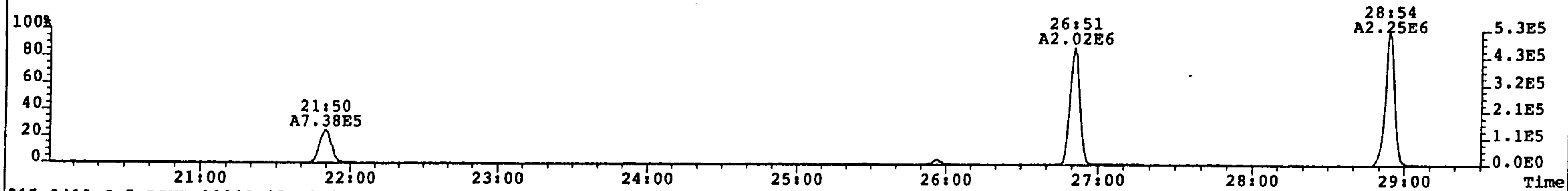


File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

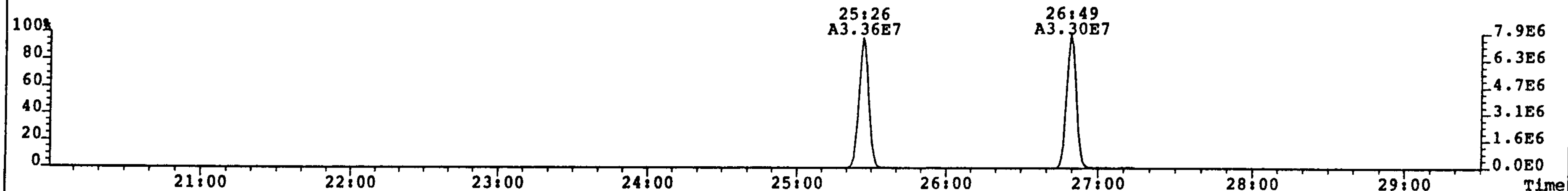
303.9016 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 157



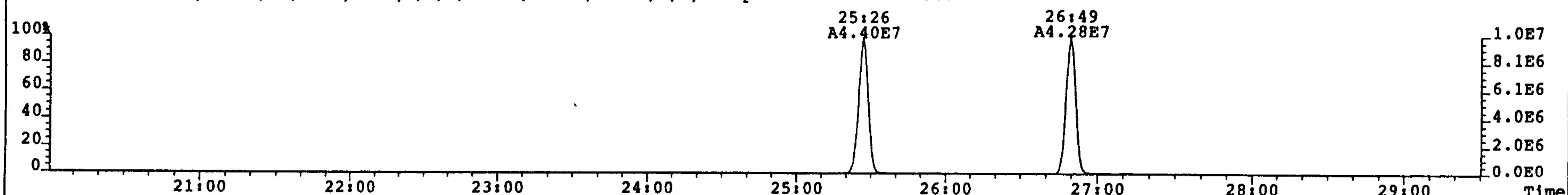

305.8987 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 284



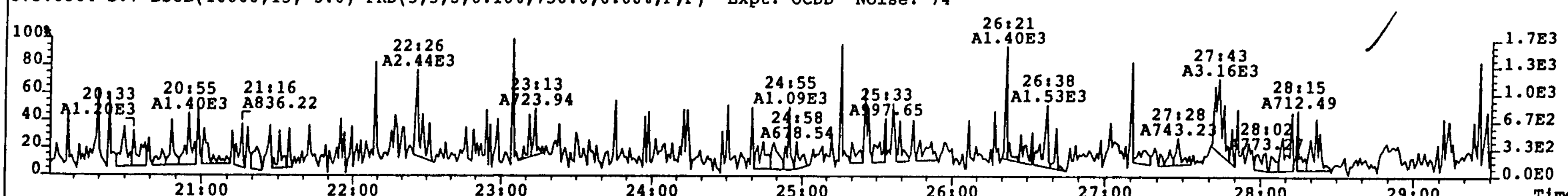

315.9419 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 253



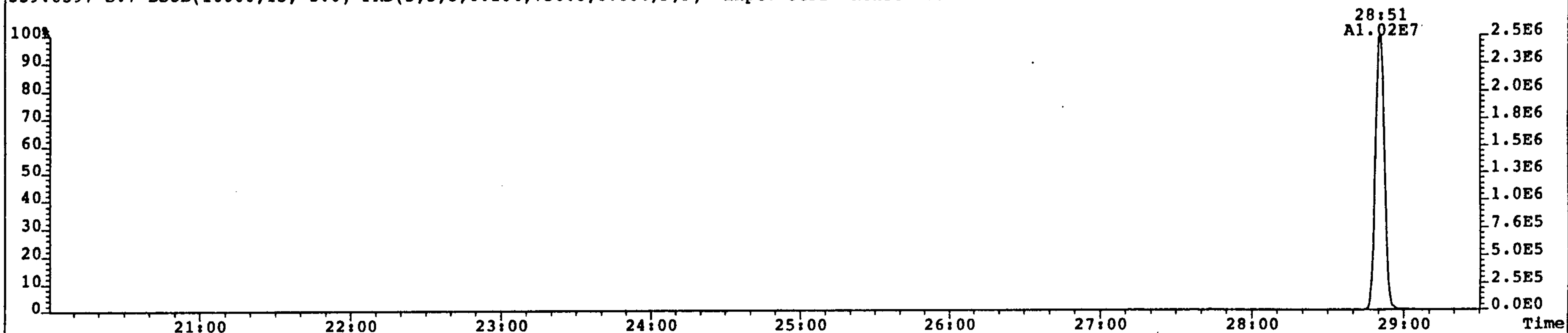

317.9389 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 568



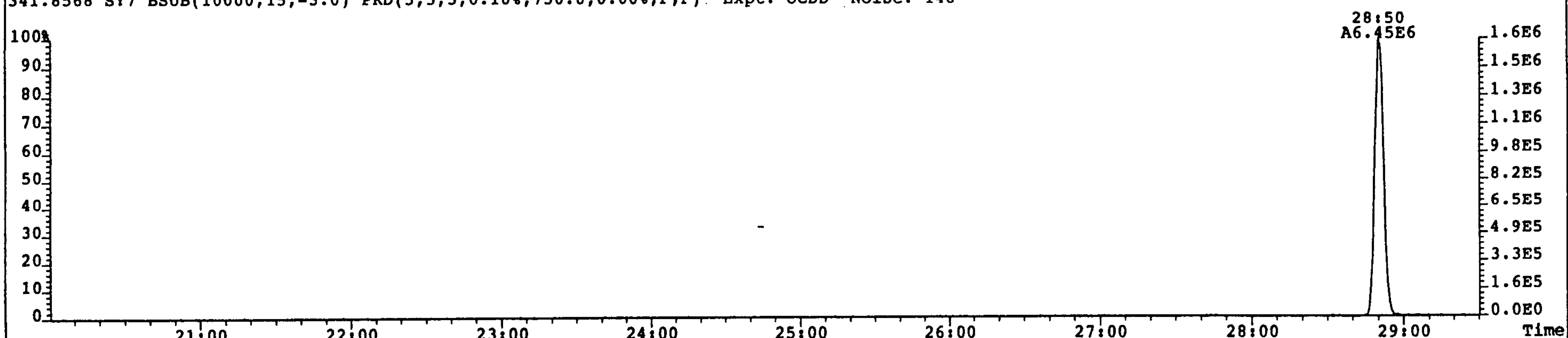

375.8364 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 74



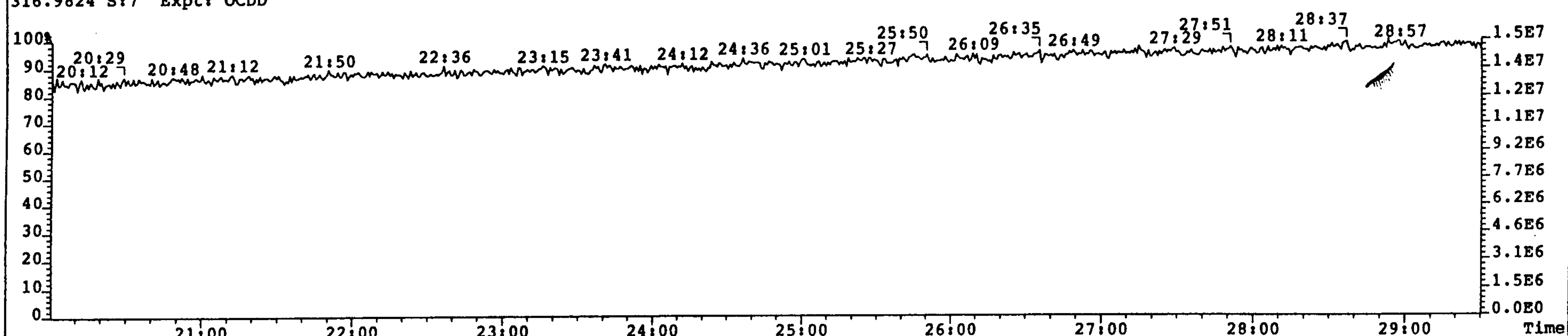
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 71



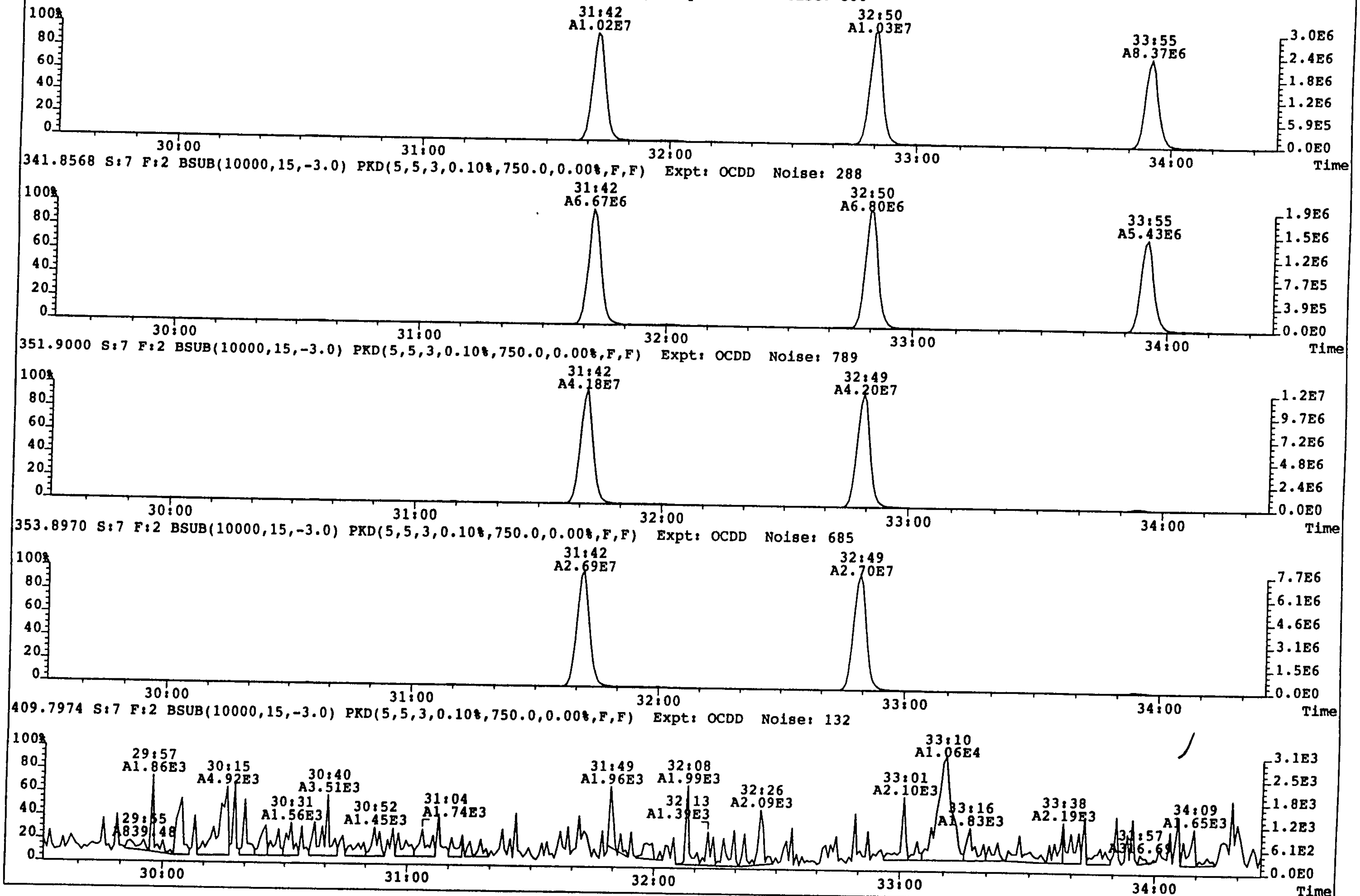

341.8568 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 148

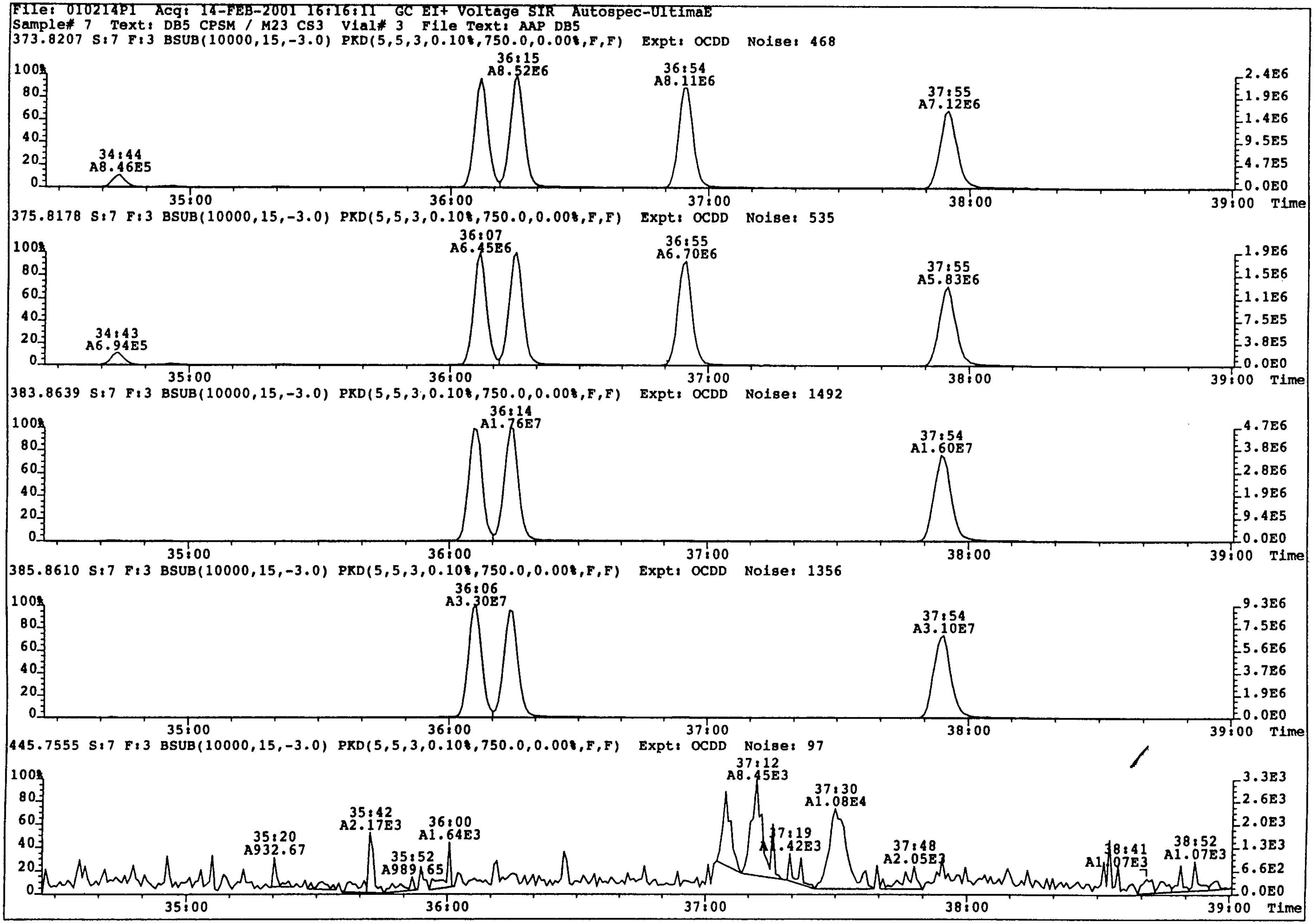


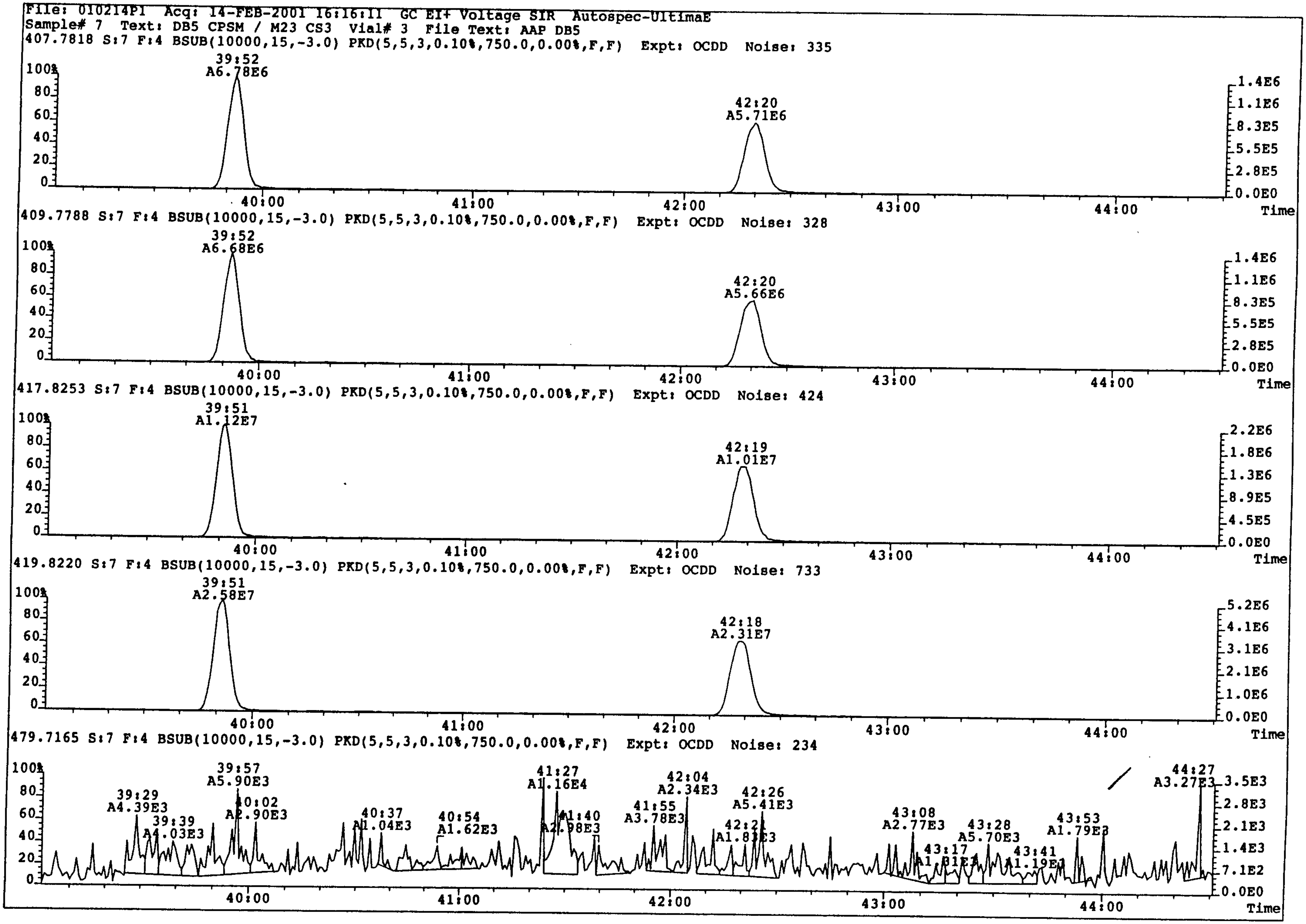

316.9824 S:7 Expt: OCDD



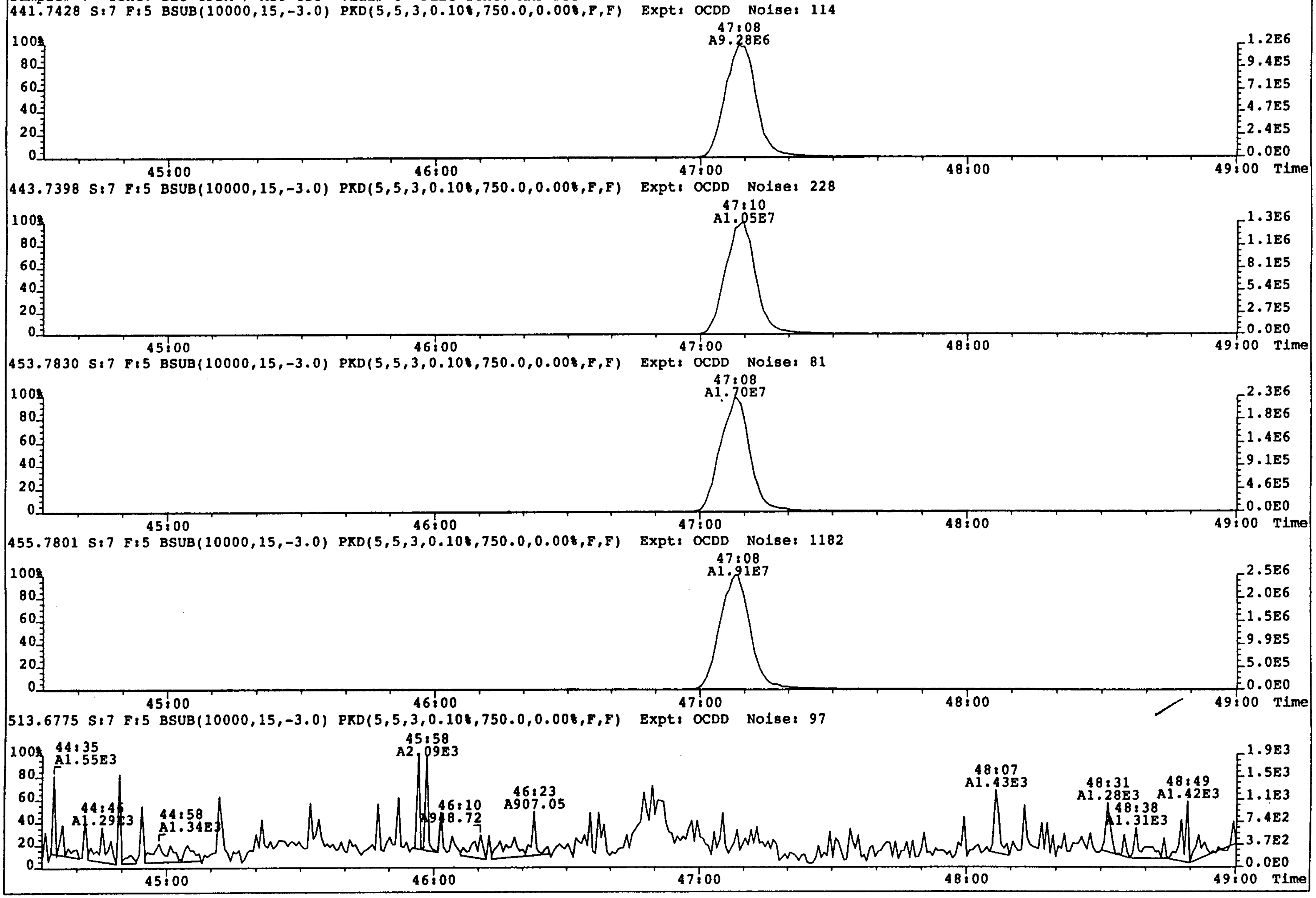
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 S:7 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 380




File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
373.8207 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 468
34:44 A8.46E5
36:15 A8.52E6
36:54 A8.11E6
37:55 A7.12E6
375.8178 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 535
34:43 A6.94E5
36:07 A6.45E6
36:55 A6.70E6
37:55 A5.83E6
383.8639 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1492
36:14 A1.76E7
37:54 A1.60E7
385.8610 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1356
36:06 A3.30E7
37:54 A3.10E7
445.7555 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 97
35:20 A932.67
35:42 A2.17E3
35:52 A989.65
36:00 A1.64E3
37:12 A8.45E3
37:19 A1.42E3
37:30 A1.08E4
37:48 A2.05E3
38:41 A1.07E3
38:52 A1.07E3
35:00
36:00
37:00
38:00
39:00 Time


File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
407.7818 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 335
39:52
A6.78E6
42:20
A5.71E6
1.4E6
1.1E6
8.3E5
5.5E5
2.8E5
0.0E0
409.7788 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 328
39:52
A6.68E6
42:20
A5.66E6
1.4E6
1.1E6
8.3E5
5.5E5
2.8E5
0.0E0
417.8253 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 424
39:51
A1.12E7
42:19
A1.01E7
2.2E6
1.8E6
1.3E6
8.9E5
4.5E5
0.0E0
419.8220 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 733
39:51
A2.58E7
42:18
A2.31E7
5.2E6
4.1E6
3.1E6
2.1E6
1.0E6
0.0E0
479.7165 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 234
39:29
A4.39E3
39:39
A4.03E3
39:57
A5.90E3
40:02
A2.90E3
40:37
A1.04E3
40:54
A1.62E3
41:27
A1.16E4
41:40
A2.98E3
41:55
A3.78E3
42:04
A2.34E3
42:21
A1.81E3
42:26
A5.41E3
43:08
A2.77E3
43:17
A1.81E3
43:28
A5.70E3
43:41
A1.19E3
43:53
A1.79E3
44:27
A3.27E3
3.5E3
2.8E3
2.1E3
1.4E3
7.1E2
0.0E0
100%
80
60
40
20
0
40:00
41:00
42:00
43:00
44:00
Time

File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



YT

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: ce

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

| NATIVE ANALYTES | M/Z'S FORMING RATIO | ION ABUND. RATIO | QC LIMITS | Pass | CONC. FOUND | CONC. RANGE (ng/mL) |
|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | M/M+2 | 0.79 | 0.65-0.89 | y | 5.81 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDD | M+2/M+4 | 1.58 | 1.32-1.78 | y | 27.34 | 18.75-31.25 |
| 1,2,3,4,7,8-HxCDD | M+2/M+4 | 1.24 | 1.05-1.43 | y | 26.17 | 18.75-31.25 |
| 1,2,3,6,7,8-HxCDD | M+2/M+4 | 1.26 | 1.05-1.43 | y | 26.81 | 18.75-31.25 |
| 1,2,3,7,8,9-HxCDD | M+2/M+4 | 1.26 | 1.05-1.43 | y | 26.29 | 18.75-31.25 |
| 1,2,3,4,6,7,8-HpCDD | M+2/M+4 | 1.03 | 0.88-1.20 | y | 25.50 | 18.75-31.25 |
| OCDD | M+2/M+4 | 0.89 | 0.76-1.02 | y | 53.07 | 37 - 65 |
| 2,3,7,8-TCDF | M/M+2 | 0.75 | 0.65-0.89 | y | 4.88 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDF | M+2/M+4 | 1.52 | 1.32-1.78 | y | 24.99 | 18.75-31.25 |
| 2,3,4,7,8-PeCDF | M+2/M+4 | 1.53 | 1.32-1.78 | y | 25.04 | 18.75-31.25 |
| 1,2,3,4,7,8-HxCDF | M+2/M+4 | 1.21 | 1.05-1.43 | y | 24.01 | 18.75-31.25 |
| 1,2,3,6,7,8-HxCDF | M+2/M+4 | 1.24 | 1.05-1.43 | y | 24.29 | 18.75-31.25 |
| 2,3,4,6,7,8-HxCDF | M+2/M+4 | 1.20 | 1.05-1.43 | y | 23.46 | 18.75-31.25 |
| 1,2,3,7,8,9-HxCDF | M+2/M+4 | 1.23 | 1.05-1.43 | y | 23.49 | 18.75-31.25 |
| 1,2,3,4,6,7,8-HpCDF | M+2/M+4 | 1.02 | 0.88-1.20 | y | 23.60 | 18.75-31.25 |
| 1,2,3,4,7,8,9-HpCDF | M+2/M+4 | 1.02 | 0.88-1.20 | y | 22.37 | 18.75-31.25 |
| OCDF | M+2/M+4 | 0.87 | 0.76-1.02 | y | 49.37 | 35 - 65 |

Analyst: GAG

Date: 23 Feb 01

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: Ce
Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

| LABELED COMPOUNDS | M/Z'S FORMING RATIO | ION ABUND. RATIO | QC LIMITS | Pass | CONC. FOUND | CONC. RANGE (ng/mL) |
|---|---|---|---|---|---|---|
| 13C-2,3,7,8-TCDD | M/M+2 | 0.80 | 0.65-0.89 | y | 91.5 | 70.0 - 130.0 |
| 13C-1,2,3,7,8-PeCDD | M+2/M+4 | 1.57 | 1.32-1.78 | y | 94.7 | 70.0 - 130.0 |
| 13C-1,2,3,6,7,8-HxCDD | M+2/M+4 | 1.20 | 1.05-1.43 | y | 96.1 | 70.0 - 130.0 |
| 13C-1,2,3,4,6,7,8-HpCDD | M+2/M+4 | 1.05 | 0.88-1.20 | y | 89.9 | 70.0 - 130.0 |
| 13C-OCDD | M+2/M+4 | 0.90 | 0.76-1.02 | y | 82.3 | 70.0 - 130.0 |
| 13C-2,3,7,8-TCDF | M/M+2 | 0.79 | 0.65-0.89 | y | 90.0 | 70.0 - 130.0 |
| 13C-1,2,3,7,8-PeCDF | M+2/M+4 | 1.58 | 1.32-1.78 | y | 84.6 | 70.0 - 130.0 |
| 13C-1,2,3,6,7,8-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 96.1 | 70.0 - 130.0 |
| 13C-1,2,3,4,6,7,8-HpCDF | M/M+2 | 0.43 | 0.37-0.51 | y | 87.2 | 70.0 - 130.0 |
| 13C-OCDF | M+2/M+4 | 0.84 | 0.76-1.02 | y | 81.8 | 70.0 - 130.0 |
| | | | | | | |
| 37Cl-2,3,7,8-TCDD | | | | | 108.0 | 75.0 - 125.0 |
| 13C-2,3,4,7,8-PeCDF | M+2/M+4 | 1.58 | 1.32-1.78 | y | 104.8 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8-HxCDD | M+2/M+4 | 1.31 | 1.05-1.43 | y | 100.9 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 102.2 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8,9-HpCDF | M/M+2 | 0.43 | 0.37-0.51 | y | 96.1 | 75.0 - 125.0 |
| | | | | | | |
| 13C-1,2,3,7,8,9-HxCDF | M/M+2 | 0.53 | 0.43-0.59 | y | 96.0 | 75.0 - 125.0 |

Analyst: GAG
Date: 24 Feb 01

OPUSquan 23-FEB-2001 17:44 Page 1

Client ID: DB5 CPSM / M23 CS3
Lab ID: CS3RC

Filename: 010223P1 S: 1 Acq: 23-FEB-01 11:17:52
GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000

ConCal: 010223P1-
EndCal: 010223P1-



| | Name | Resp | RA | | RRF | RT | Conc | Qualif. | CDE | noise | Fac | DL | EMPC | Rec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2,3,7,8-TCDD | 3.72e+06 | 0.79 | y | 1.26 | 27:38 | 5.81 | | | 1252 | 2.5 | 0.0365 | | |
| | 1,2,3,7,8-PeCDD | 1.19e+07 | 1.58 | y | 1.01 | 33:06 | 27.3 | | | 120888 | 2.5 | 7.34 | | |
| | 1,2,3,4,7,8-HxCDD | 1.00e+07 | 1.24 | y | 1.14 | 37:01 | 26.2 | | | 2240 | 2.5 | 0.126 | | |
| | 1,2,3,6,7,8-HxCDD | 9.23e+06 | 1.26 | y | 1.02 | 37:08 | 26.8 | | | 2240 | 2.5 | 0.140 | | |
| | 1,2,3,7,8,9-HxCDD | 1.01e+07 | 1.26 | y | 1.14 | 37:27 | 26.3 | | | 2240 | 2.5 | 0.126 | | |
| | 1,2,3,4,6,7,8-HpCDD | 8.79e+06 | 1.03 | y | 1.13 | 41:25 | 25.5 | | | 2394 | 2.5 | 0.193 | | |
| | OCDD | 1.23e+07 | 0.89 | y | 1.03 | 46:44 | 53.1 | | | 1218 | 2.5 | 0.181 | | |
| | 2,3,7,8-TCDF | 3.68e+06 | 0.75 | y | 1.05 | 26:45 | 4.88 | | | 2421 | 2.5 | 0.0638 | | |
| | 1,2,3,7,8-PeCDF | 1.59e+07 | 1.52 | y | 1.04 | 31:37 | 25.0 | | | 6785 | 2.5 | 0.259 | | |
| | 2,3,4,7,8-PeCDF | 1.61e+07 | 1.53 | y | 1.05 | 32:45 | 25.0 | | | 6785 | 2.5 | 0.255 | | |
| | 1,2,3,4,7,8-HxCDF | 1.25e+07 | 1.21 | y | 1.13 | 36:02 | 24.0 | | | 1783 | 2.5 | 0.0508 | | |
| | 1,2,3,6,7,8-HxCDF | 1.39e+07 | 1.24 | y | 1.24 | 36:11 | 24.3 | | | 1783 | 2.5 | 0.0464 | | |
| | 2,3,4,6,7,8-HxCDF | 1.26e+07 | 1.20 | y | 1.16 | 36:50 | 23.5 | | | 1783 | 2.5 | 0.0493 | | |
| | 1,2,3,7,8,9-HxCDF | 1.10e+07 | 1.23 | y | 1.02 | 37:51 | 23.5 | | | 1783 | 2.5 | 0.0564 | | |
| | 1,2,3,4,6,7,8-HpCDF | 1.07e+07 | 1.02 | y | 1.54 | 39:47 | 23.6 | | | 2071 | 2.5 | 0.0802 | | |
| | 1,2,3,4,7,8,9-HpCDF | 8.58e+06 | 1.02 | y | 1.30 | 42:14 | 22.4 | | | 2071 | 2.5 | 0.0952 | | |
| | OCDF | 1.41e+07 | 0.87 | y | 1.15 | 47:03 | 49.4 | | | 1290 | 2.5 | 0.147 | | |
| | Total Tetra-Dioxins | 1.49e+07 | 0.77 | y | 1.26 | 21:16 | 23.3 | | | 1252 | 2.5 | 0.0365 | 23.5 | |
| | Total Penta-Dioxins | 3.16e+07 | 1.56 | y | 1.01 | 30:33 | 72.8 | | | 120888 | 2.5 | 7.34 | 73.1 | |
| | Total Hexa-Dioxins | 3.06e+07 | 1.25 | y | 1.10 | 35:19 | 82.7 | | | 2240 | 2.5 | 0.130 | 83.2 | |
| | Total Hepta-Dioxins | 1.64e+07 | 1.02 | y | 1.13 | 40:13 | 47.6 | | | 2394 | 2.5 | 0.193 | 48.2 | |
| | Total Tetra-Furans | 9.06e+06 | 0.84 | y | 1.05 | 20:13 | 12.0 | | | 2421 | 2.5 | 0.0638 | 12.5 | |
| | 1st Fnc. Penta-Furans | 1.31e+07 | 1.64 | y | 1.05 | 28:45 | 20.5 | | | 2687 | 2.5 | 0.102 | 20.5 | |
| | Total Penta-Furans | 4.49e+07 | 1.52 | y | 1.05 | 31:37 | 70.3 | | | 6785 | 2.5 | 0.257 | | |
| | PeCDF Totals: | | | | | | 90.8 | | | | | | 91.1 | |
| | Total Hexa-Furans | 5.17e+07 | 1.19 | y | 1.14 | 34:39 | 98.3 | | | 1783 | 2.5 | 0.0505 | 98.9 | |
| | Total Hepta-Furans | 1.95e+07 | 1.02 | y | 1.42 | 39:47 | 46.3 | | | 2071 | 2.5 | 0.0870 | 46.9 | |
| IS | 13C-2,3,7,8-TCDD | 5.08e+07 | 0.80 | y | 1.13 | 27:37 | 91.5 | | | | | | | 91.5 |
| IS | 13C-1,2,3,7,8-PeCDD | 4.29e+07 | 1.57 | y | 0.93 | 33:06 | 94.7 | | | | | | | 94.7 |
| IS | 13C-1,2,3,6,7,8-HxCDD | 3.36e+07 | 1.20 | y | 0.93 | 37:07 | 96.1 | | | | | | | 96.1 |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 3.05e+07 | 1.05 | y | 0.91 | 41:24 | 89.9 | | | | | | | 89.9 |
| IS | 13C-OCDD | 2.26e+07 | 0.90 | y | 0.73 | 46:42 | 82.3 | | | | | | | 82.3 |
| IS | 13C-2,3,7,8-TCDF | 7.20e+07 | 0.79 | y | 1.06 | 26:43 | 90.0 | | | | | | | 90.0 |
| IS | 13C-1,2,3,7,8-PeCDF | 6.11e+07 | 1.58 | y | 0.96 | 31:36 | 84.6 | | | | | | | 84.6 |
| IS | 13C-1,2,3,6,7,8-HxCDF | 4.62e+07 | 0.52 | y | 1.28 | 36:10 | 96.1 | | | | | | | 96.1 |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 2.95e+07 | 0.43 | y | 0.90 | 39:46 | 87.2 | | | | | | | 87.2 |
| IS | 13C-OCDF | 2.49e+07 | 0.84 | y | 0.81 | 47:01 | 81.8 | | | | | | | 81.8 |
| RS/RT | 13C-1,2,3,4-TCDD | 4.89e+07 | 0.81 | y | 1.00 | 26:57 | 100 | | | | | | | - |
| RS | 13C-1,2,3,4-TCDF | 7.54e+07 | 0.77 | y | 1.00 | 25:20 | 100 | | | | | | | - |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD | 3.75e+07 | 1.26 | y | 1.00 | 37:26 | 100 | | | | | | | - |
| PS | 37Cl-2,3,7,8-TCDD | 2.82e+07 | | | 0.51 | 27:38 | 108 | | | | | | | 108 |
| PS | 13C-2,3,4,7,8-PeCDF | 6.24e+07 | 1.58 | y | 0.97 | 32:44 | 105 | | | | | | | 105 |
| PS | 13C-1,2,3,4,7,8-HxCDD | 3.13e+07 | 1.31 | y | 0.92 | 37:00 | 101 | | | | | | | 101 |
| PS | 13C-1,2,3,4,7,8-HxCDF | 4.30e+07 | 0.52 | y | 0.91 | 36:02 | 102 | | | | | | | 102 |
| PS | 13C-1,2,3,4,7,8,9-HpCDF | 2.42e+07 | 0.43 | y | 0.85 | 42:13 | 96.1 | | | | | | | 96.1 |
| AS | 13C-1,2,3,7,8,9-HxCDF | 3.85e+07 | 0.53 | y | 1.07 | 37:50 | 96.0 | | | | | | | 96.0 |

Reviewer: Ce

Date: 24Feb01

Analyst: GAG

Date: 24Feb01

FORM 5
PCDD/PCDF RT WINDOW AND ISOMER SPECIFICITY STANDARDS

Lab Name: Alta Analytical Perspectives Episode No.:

Contract No.: SAS No.:

Instrument ID: MM-1 Initial Calibration Date: 10/5/00

RT Window Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

DB-5 IS Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

DB_225 IS Data Filename: Analysis Date: Time:

Reviewer: ce

Date: 24 Feb 01

DB-5 RT WINDOW DEFINING STANDARDS RESULTS

| ISOMERS | ABSOLUTE RT | ISOMERS | ABSOLUTE RT |
|---|---|---|---|
| 1,3,6,8-TCDD (F) | 23:52 | 1,3,6,8-TCDF (F) | 21:41 |
| 1,2,8,9-TCDD (L) | 28:38 | 1,2,8,9-TCDF (L) | 28:48 |
| 1,2,4,7,9-PeCDD (F) | 30:33 | 1,3,4,6,8-PeCDF (F) | 28:45 |
| 1,2,3,8,9-PeCDD (L) | 33:33 | 1,2,3,8,9-PeCDF (L) | 33:51 |
| 1,2,4,6,7,9-HxCDD (F) | 35:19 | 1,2,3,4,6,8-HxCDF (F) | 34:39 |
| 1,2,3,7,8,9-HxCDD (L) | 37:27 | 1,2,3,7,8,9-HxCDF (L) | 37:51 |
| 1,2,3,4,6,7,9-HpCDD (F) | 40:13 | 1,2,3,4,6,7,8-HpCDF (F) | 39:47 |
| 1,2,3,4,6,7,8-HpCDD (L) | 41:25 | 1,2,3,4,7,8,9-HpCDF (L) | 42:14 |

(F) = First eluting isomer (DB-5); (L) = Last eluting isomer (DB-5).

================================================================================

ISOMER SPECIFICITY (IS) TEST STANDARD RESULTS

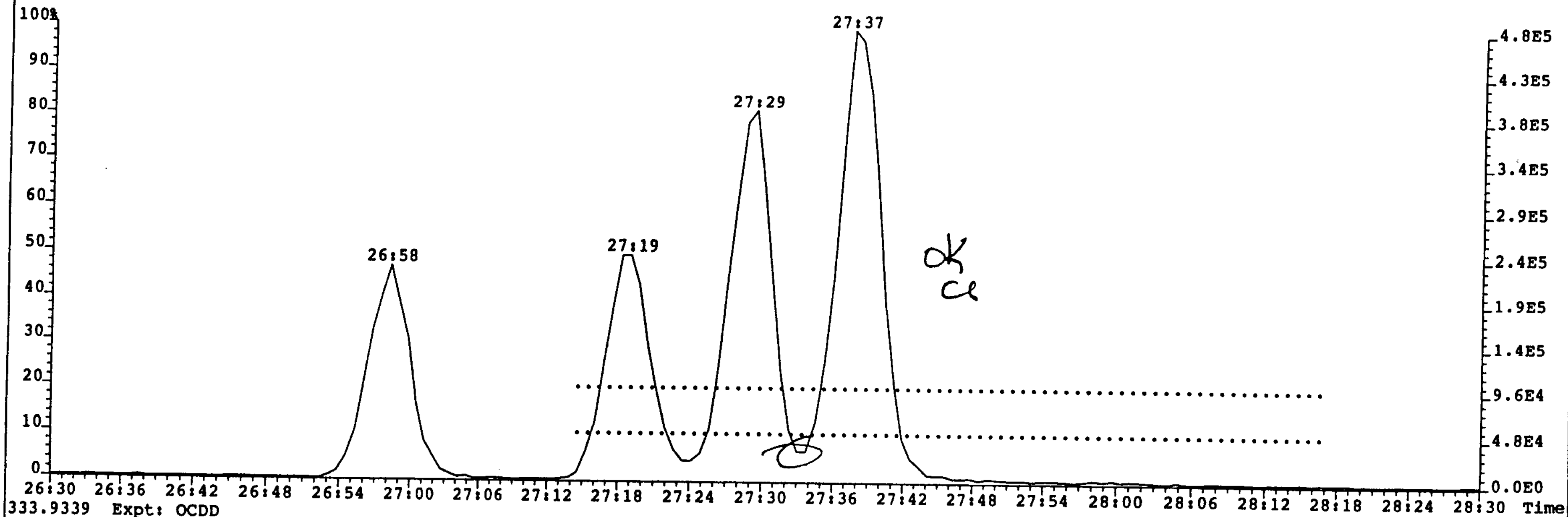
% VALLEY HEIGHT
BETWEEN
COMPARED PEAKS (1)

<25%

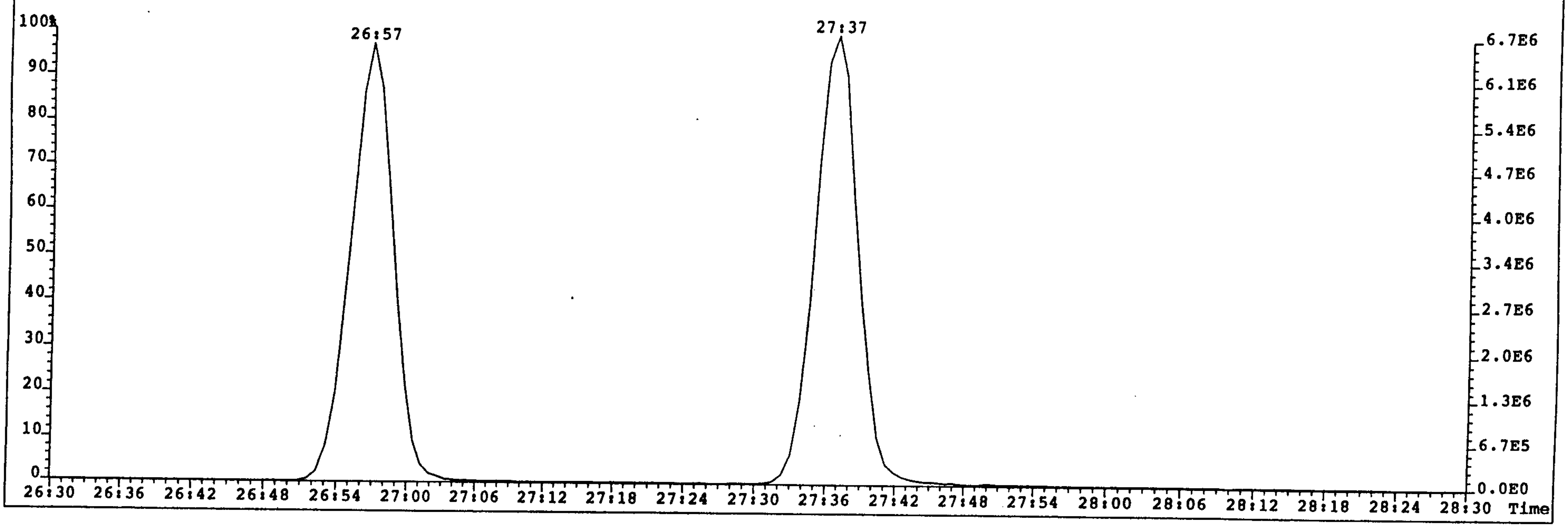
Analyst:

Date:

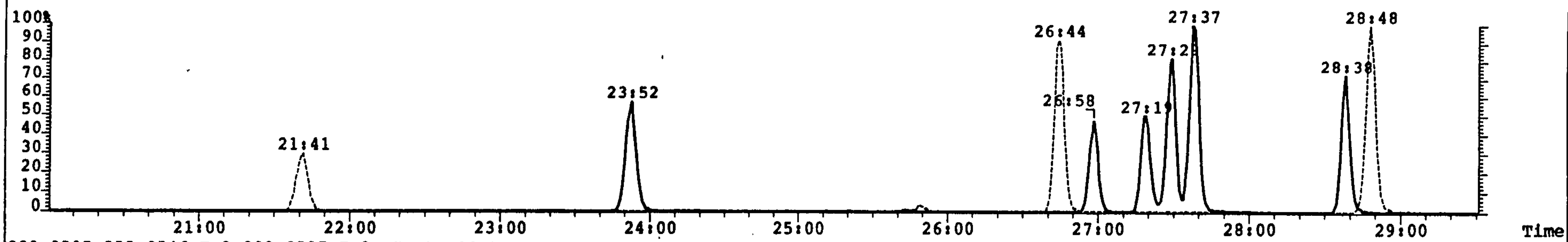
File: 010223P1  Acq: 23-FEB-2001 11:17:52  GC EI+ Voltage SIR  Autospec-UltimaE
Sample# 1  Text: DB5 CPSM / M23 CS3  Vial# 3  File Text: AAP DB5
321.8936  Expt: OCDD



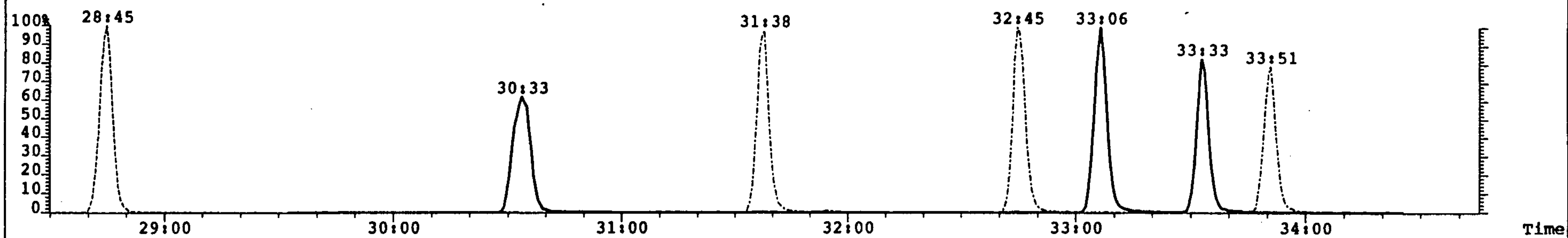

333.9339  Expt: OCDD



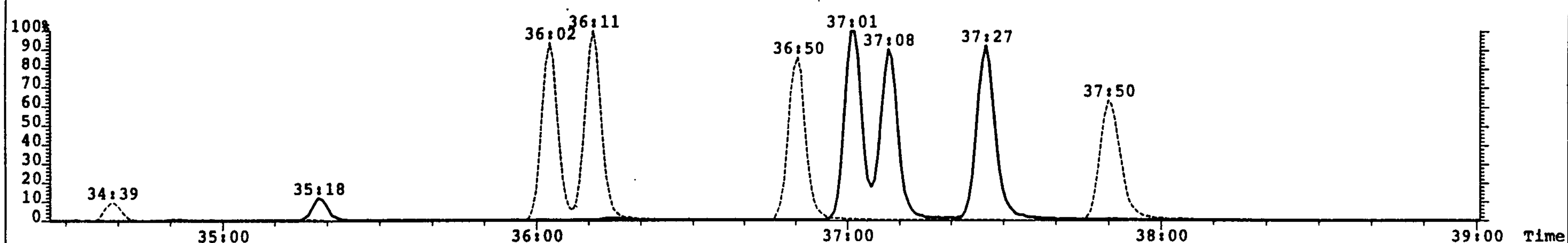
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
305.8987,321.8936 Expt: OCDD



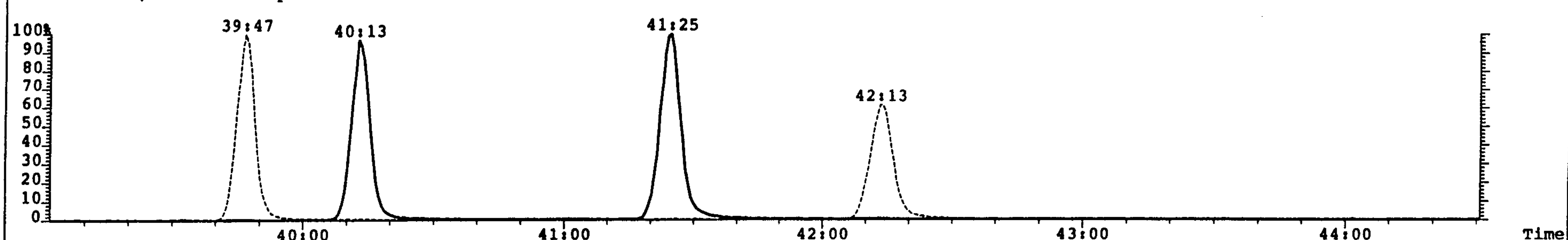

339.8597,355.8546 F:2,339.8597 F:2 Expt: OCDD



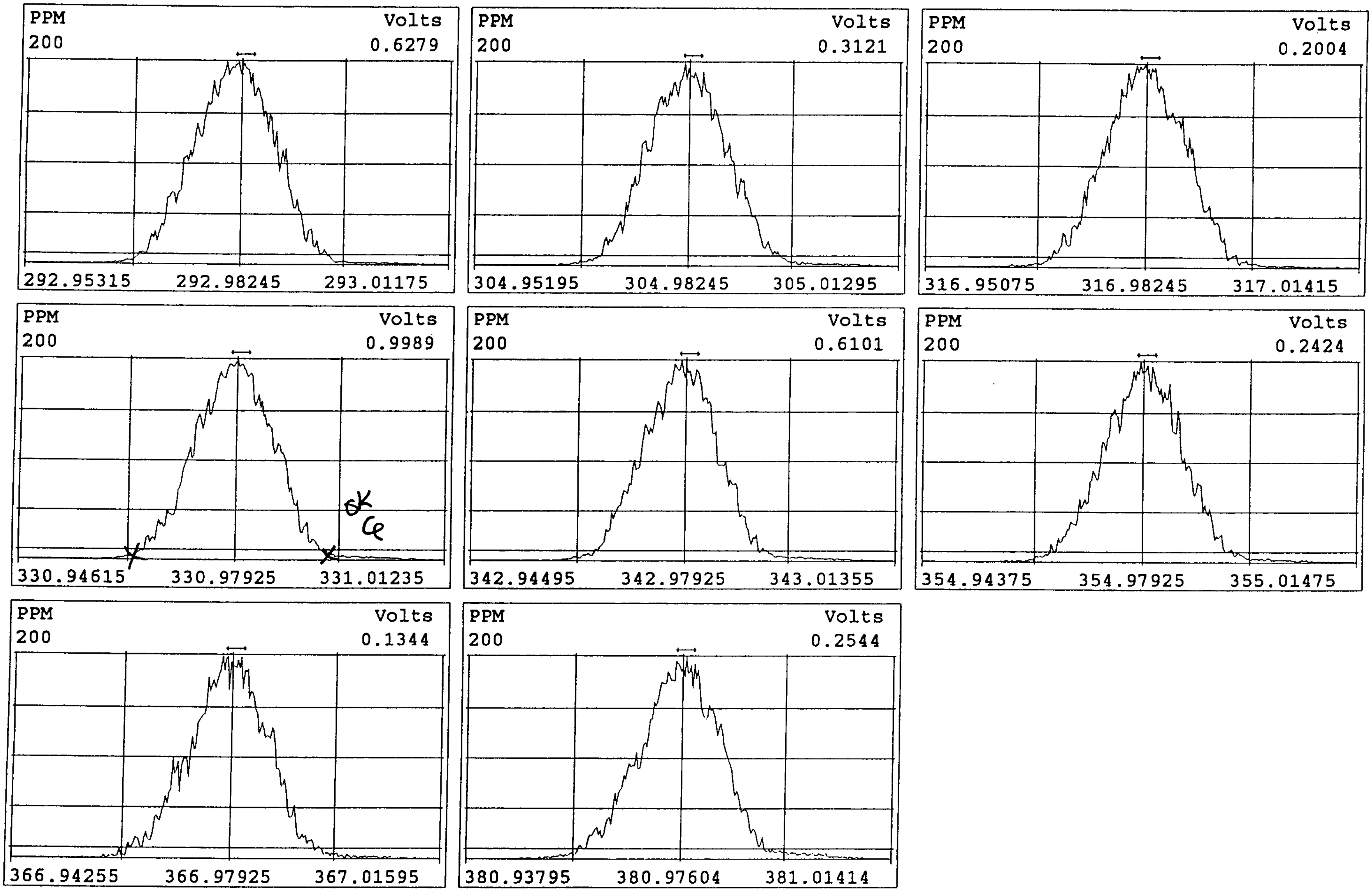

F:3 373.8207,389.8156 Expt: OCDD



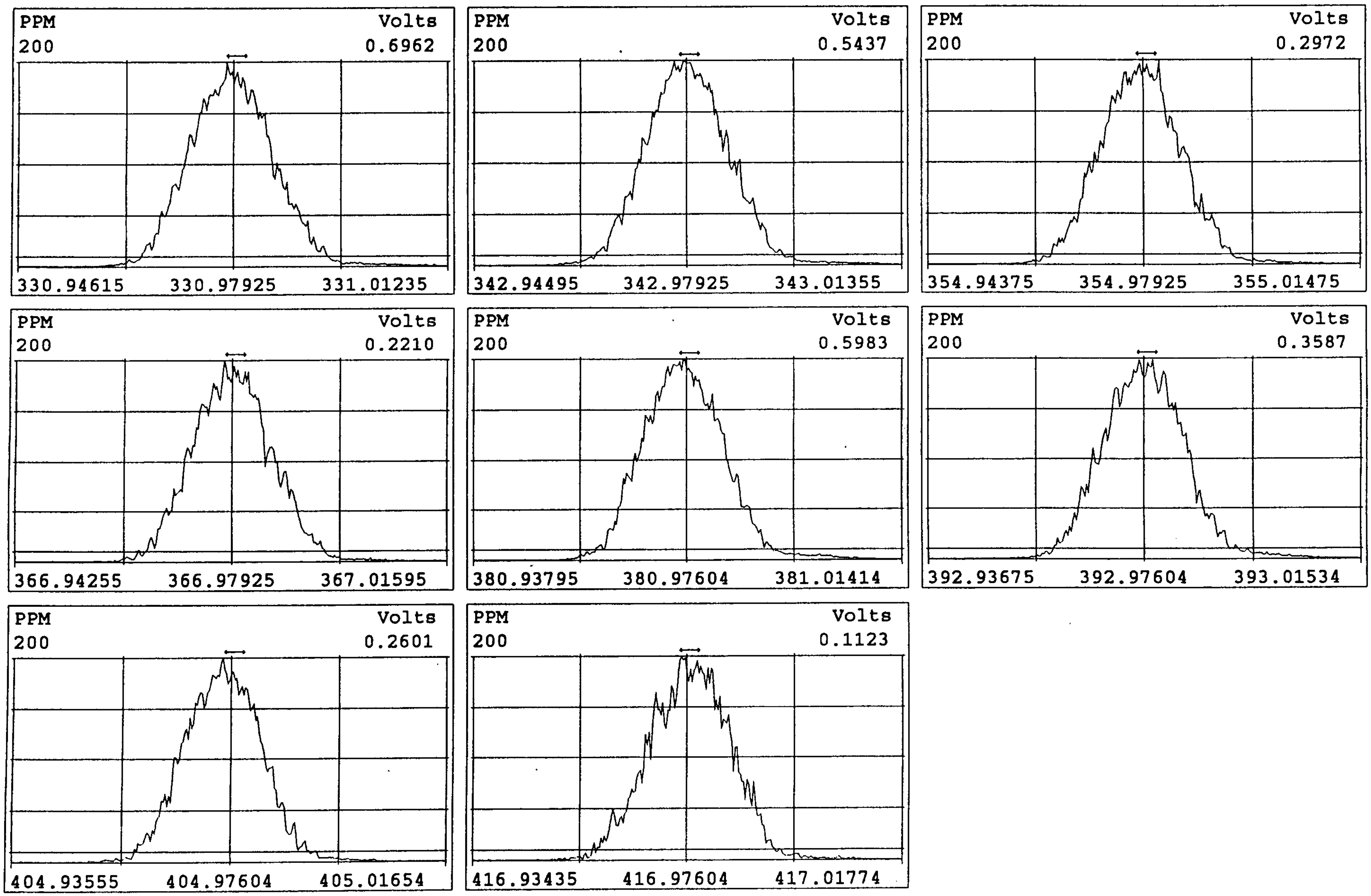

F:4 407.7818,423.7767 Expt: OCDD



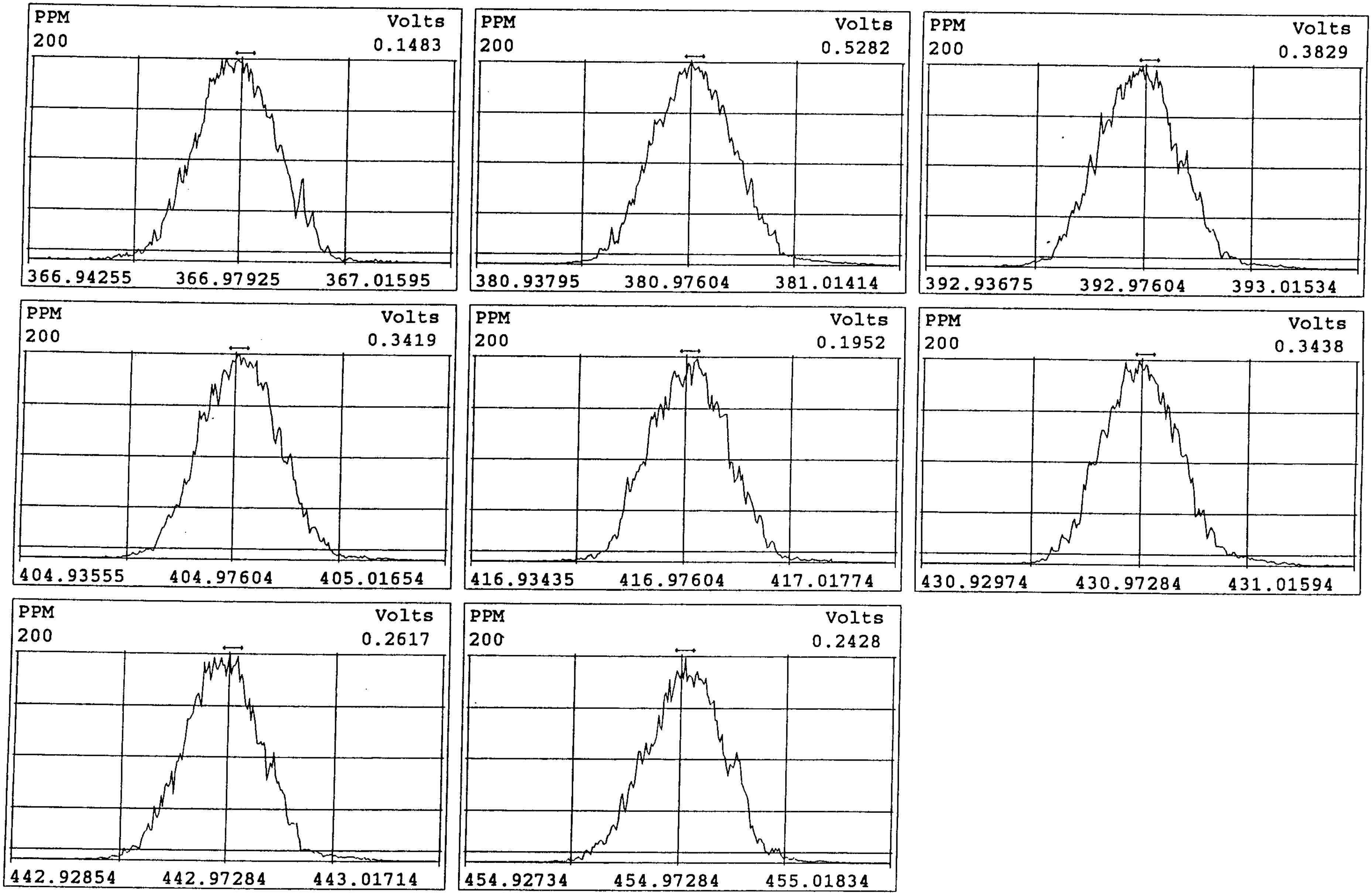
Peak Locate Examination:23-FEB-2001:11:15 File:010223P1
Experiment:OCDD Function:1 Reference:PFK2



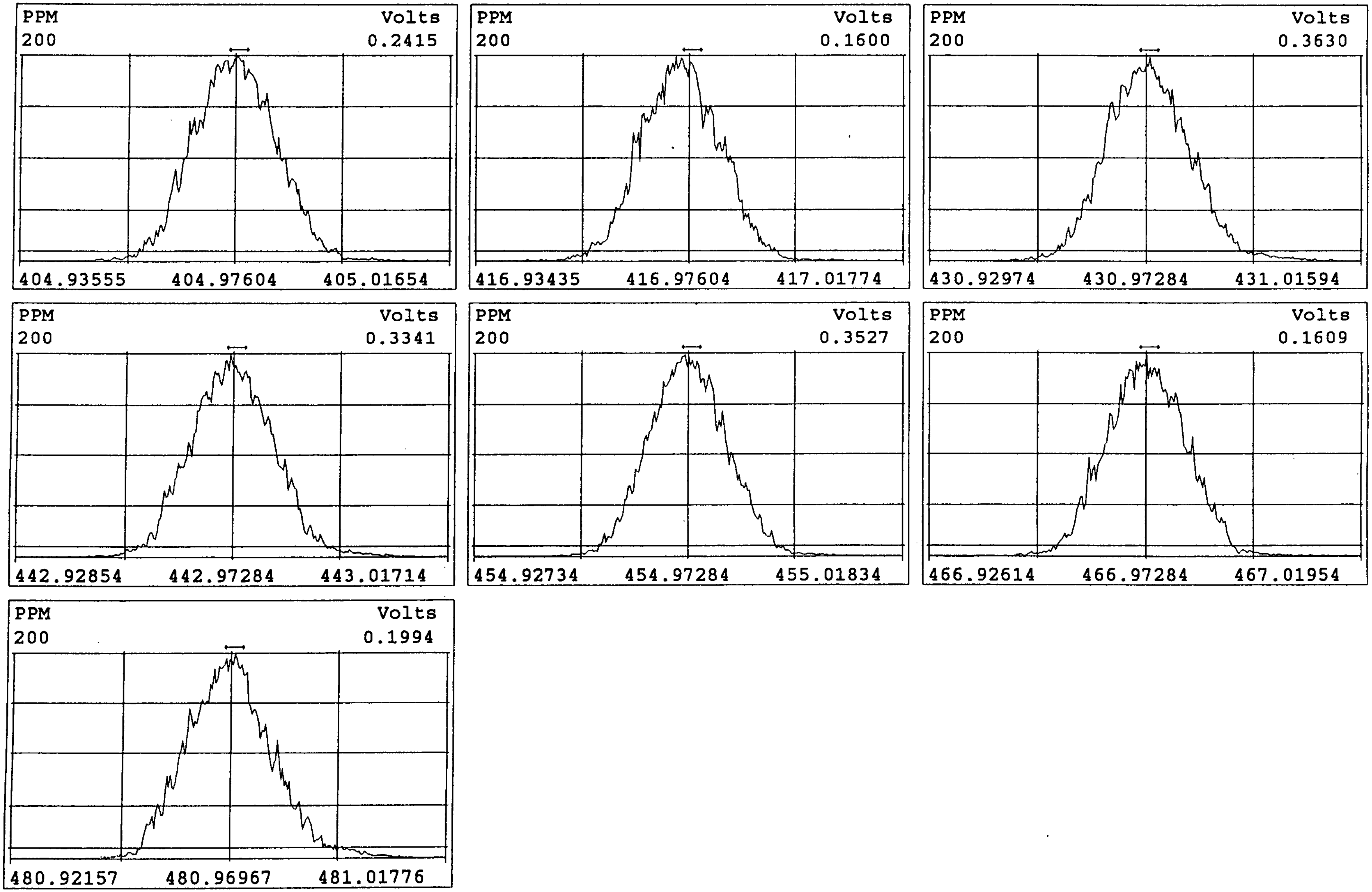
Peak Locate Examination:23-FEB-2001:11:16 File:010223P1
Experiment:OCDD Function:2 Reference:PFK2



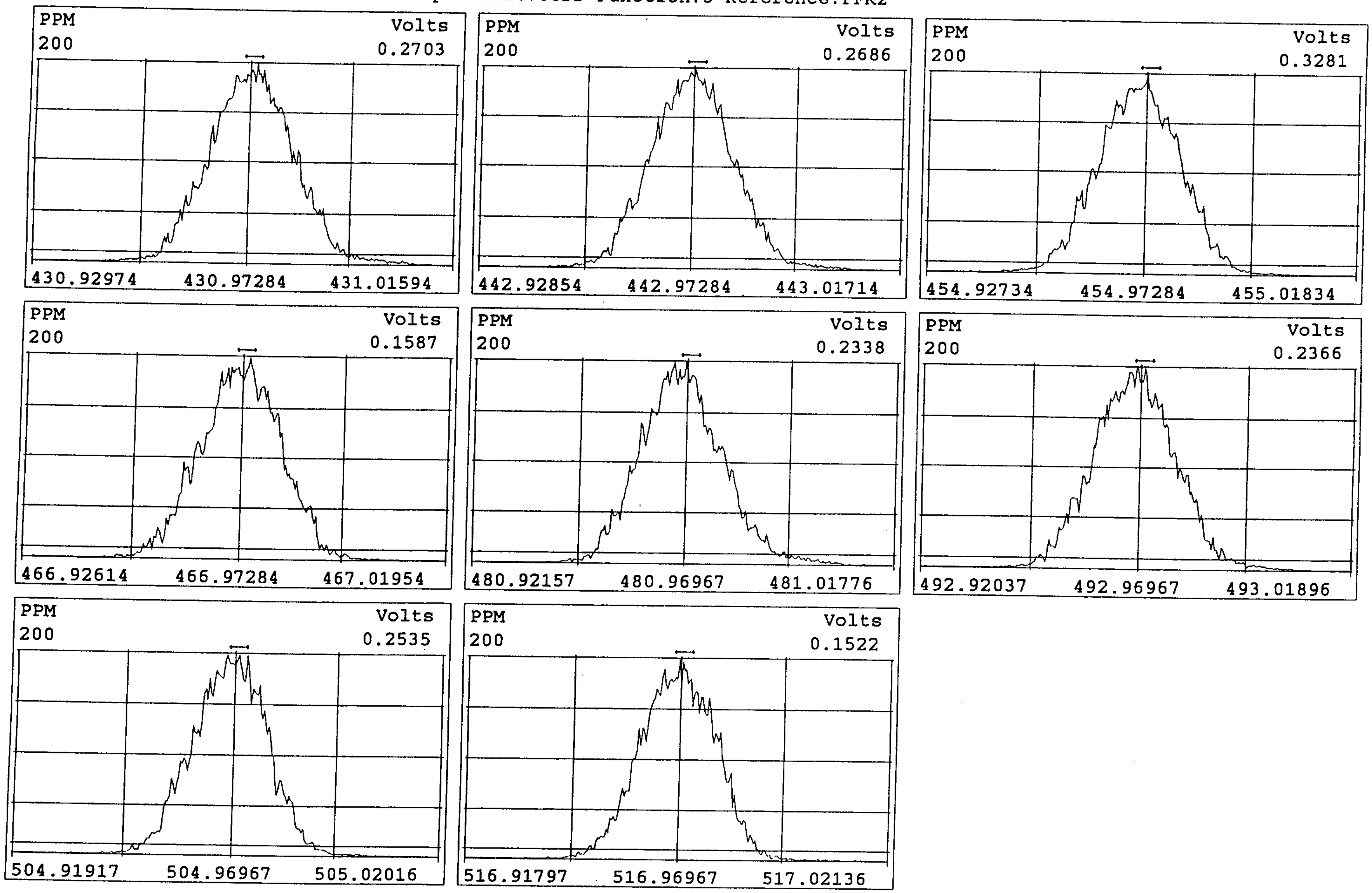
Peak Locate Examination:23-FEB-2001:11:16 File:010223P1
Experiment:OCDD Function:3 Reference:PFK2



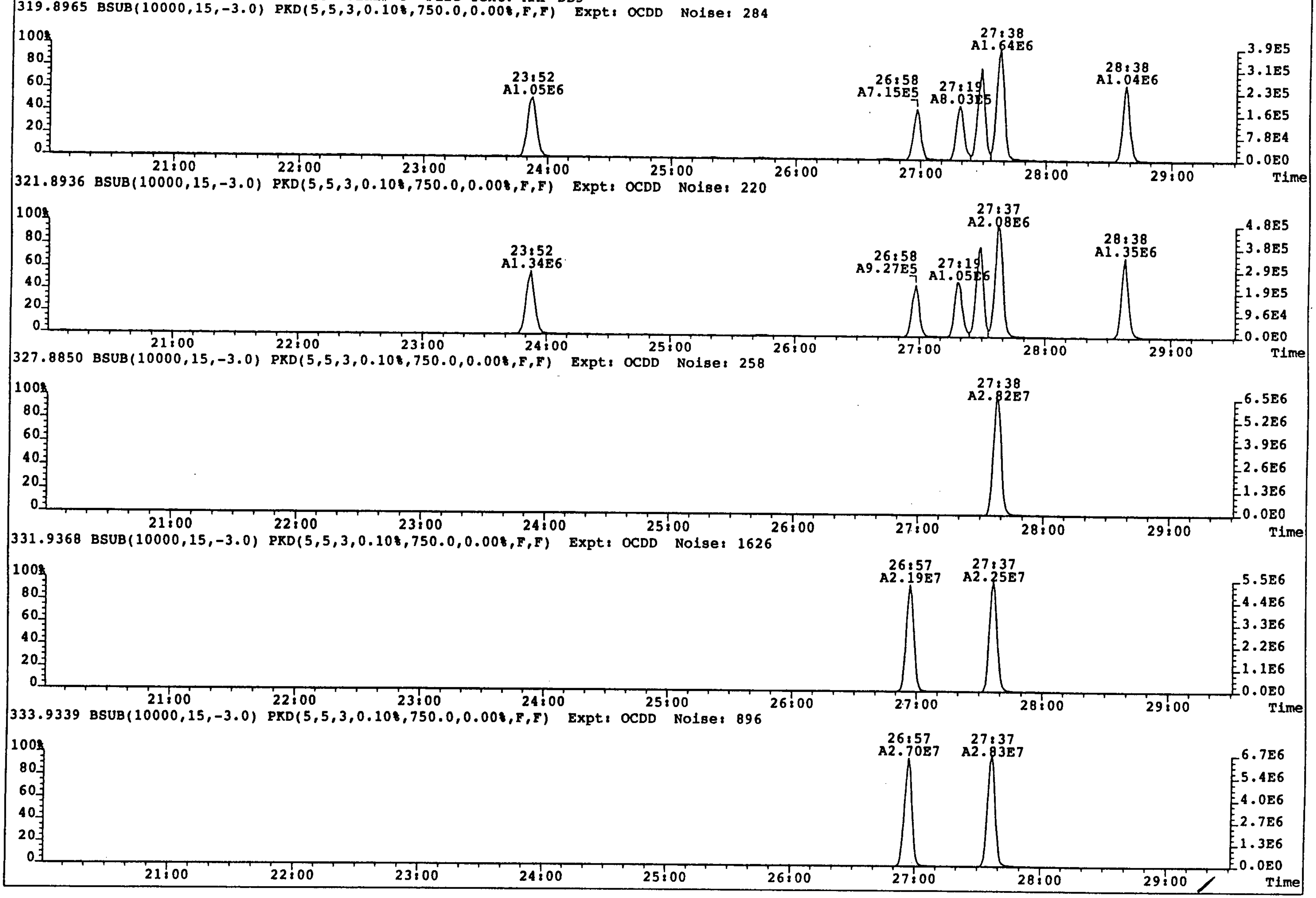
Peak Locate Examination:23-FEB-2001:11:16 File:010223P1
Experiment:OCDD Function:4 Reference:PFK2

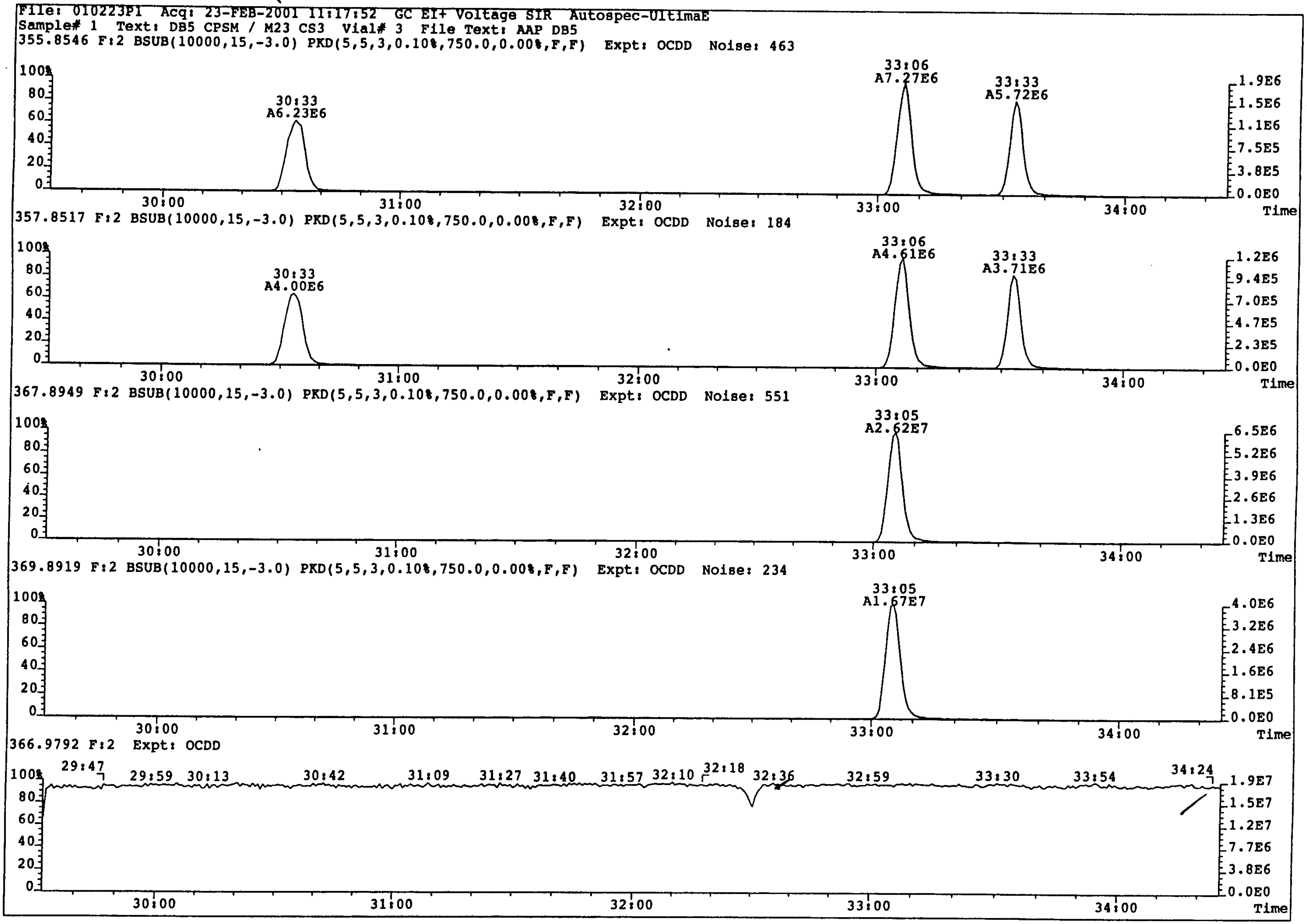


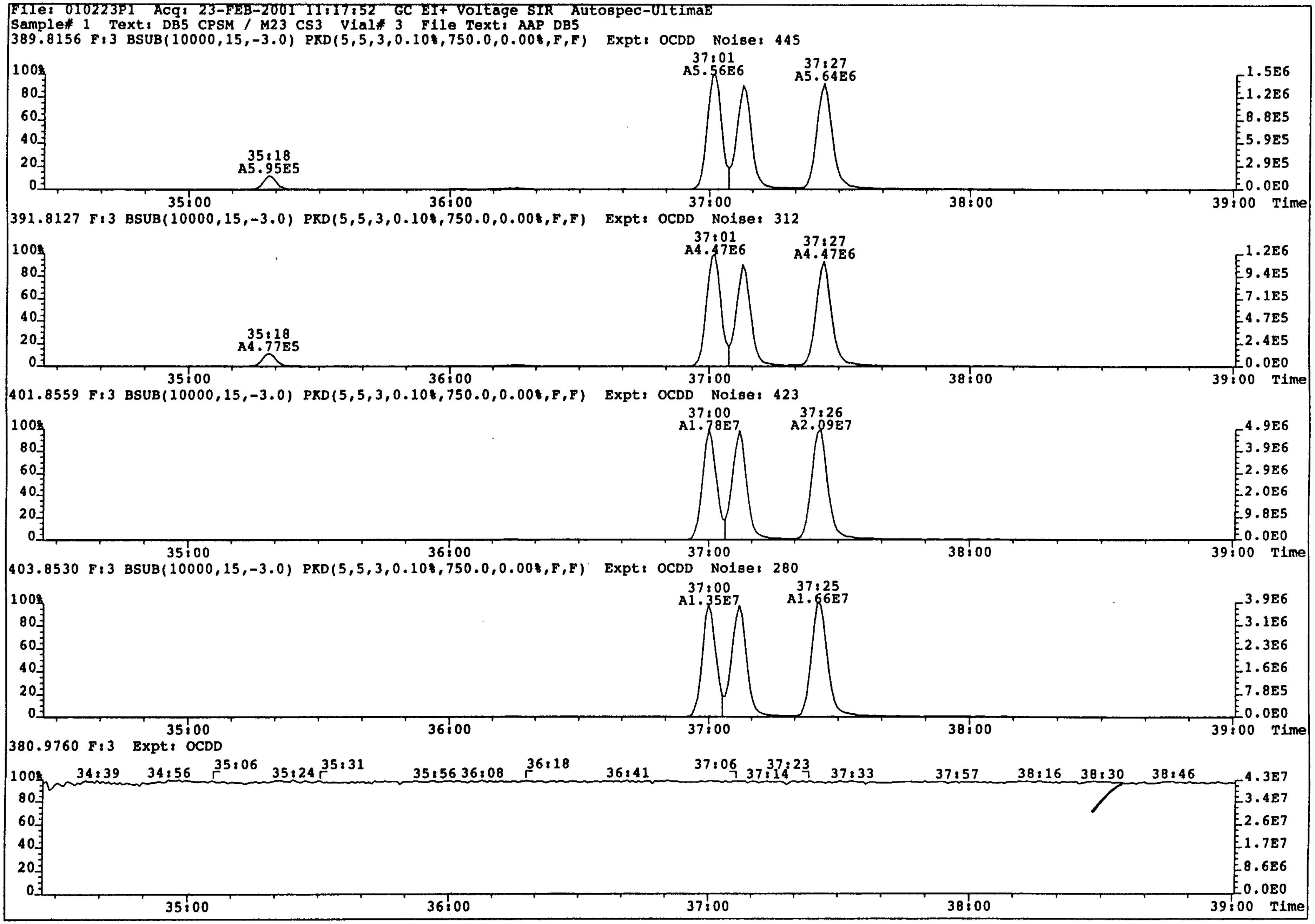
Peak Locate Examination:23-FEB-2001:11:17 File:010223P1
Experiment:OCDD Function:5 Reference:PFK2



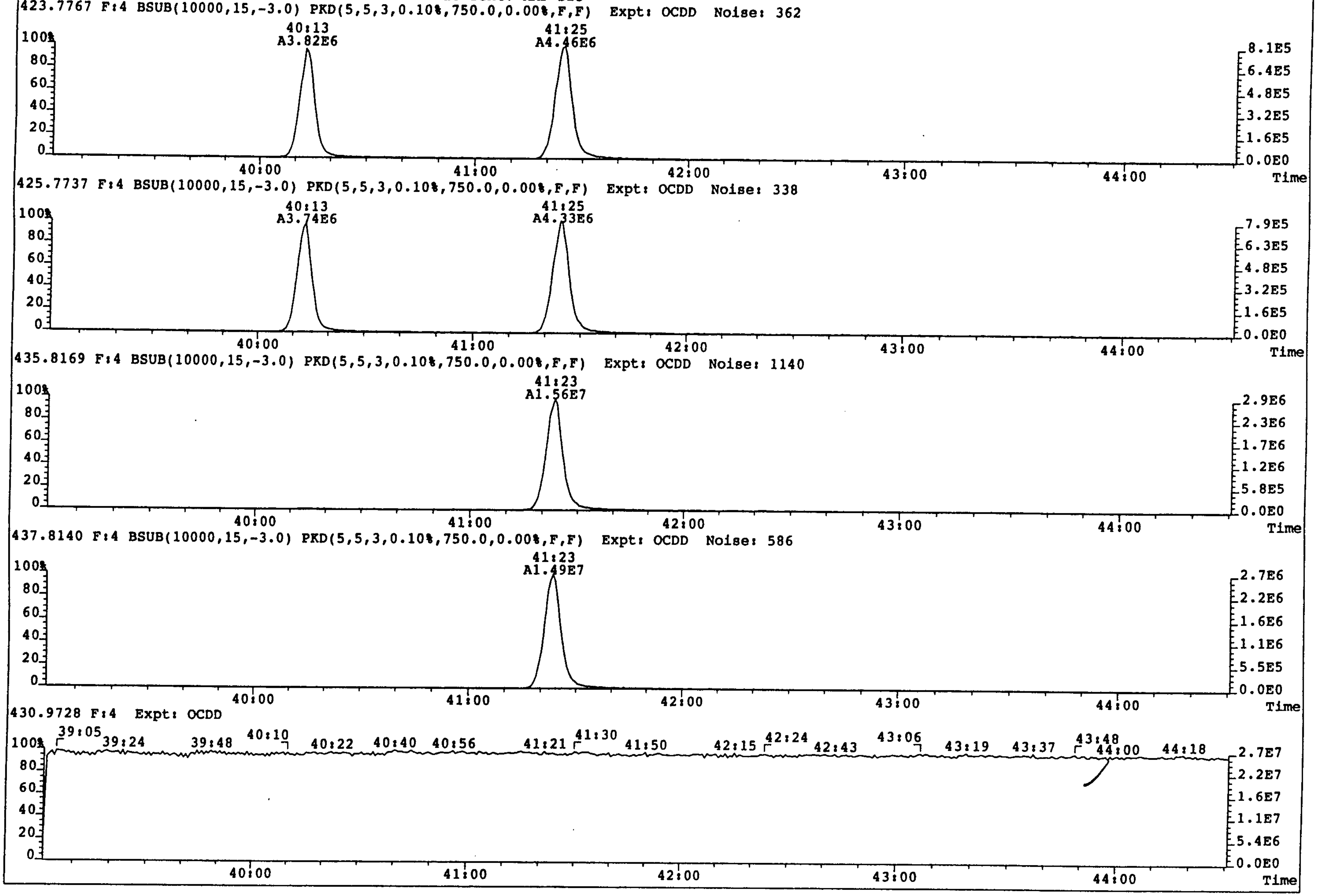
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



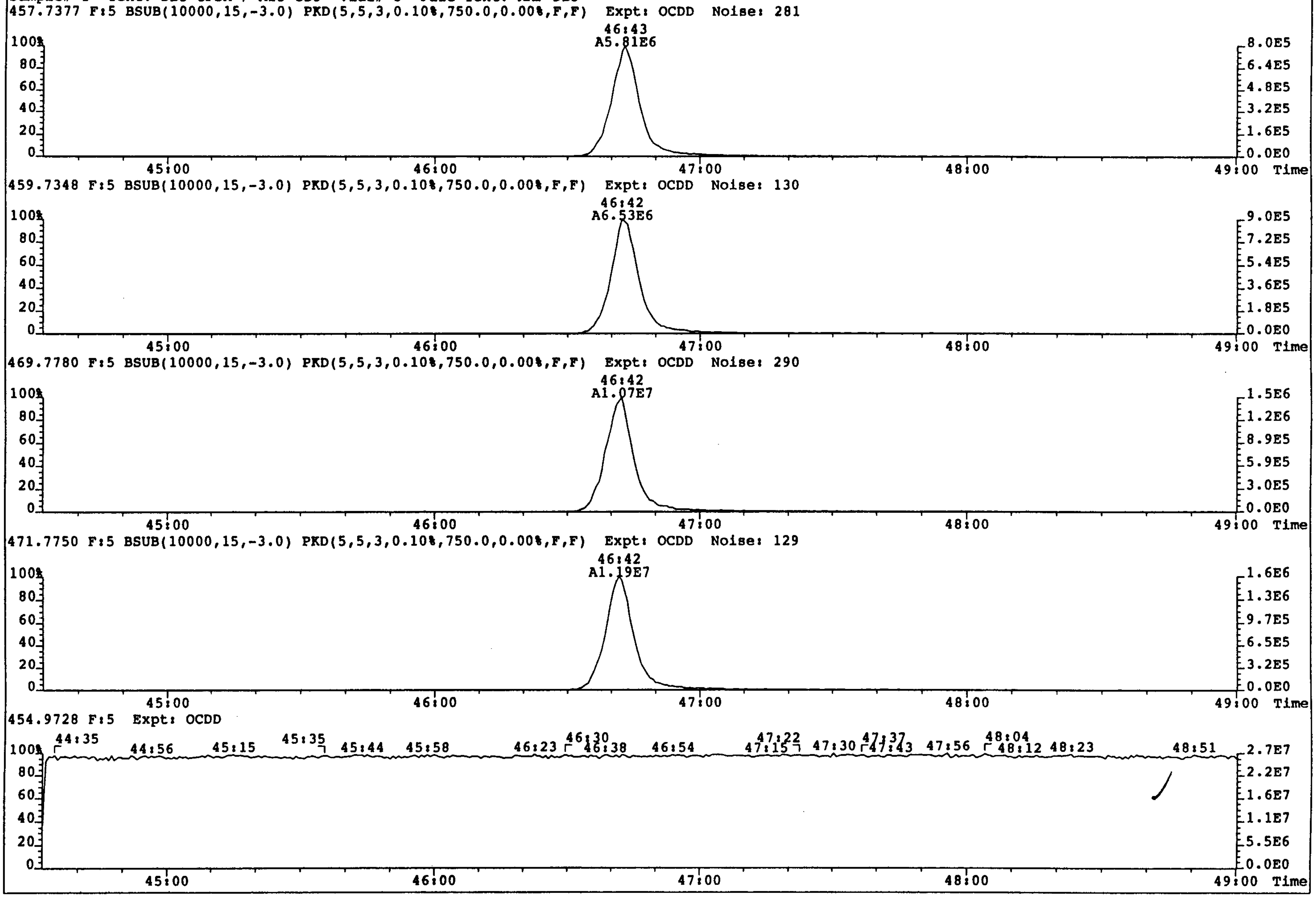

File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
355.8546 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 463
30:33 A6.23E6
33:06 A7.27E6
33:33 A5.72E6
357.8517 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 184
30:33 A4.00E6
33:06 A4.61E6
33:33 A3.71E6
367.8949 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 551
33:05 A2.62E7
369.8919 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 234
33:05 A1.67E7
366.9792 F:2 Expt: OCDD
29:47 29:59 30:13 30:42 31:09 31:27 31:40 31:57 32:10 32:18 32:36 32:59 33:30 33:54 34:24
30:00
31:00
32:00
33:00
34:00
Time

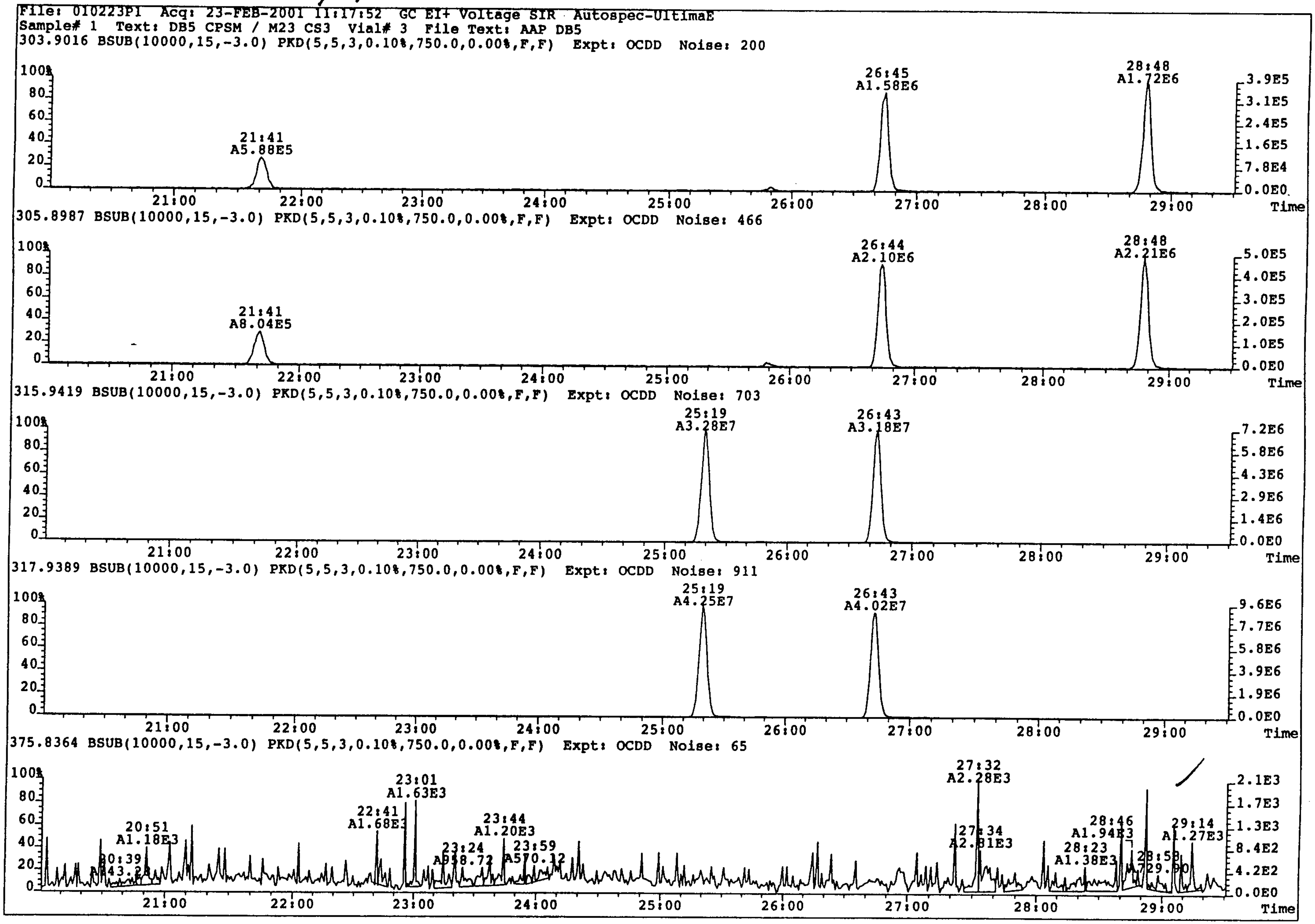

File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
389.8156 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 445
35:18 A5.95E5
37:01 A5.56E6
37:27 A5.64E6
391.8127 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 312
35:18 A4.77E5
37:01 A4.47E6
37:27 A4.47E6
401.8559 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 423
37:00 A1.78E7
37:26 A2.09E7
403.8530 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 280
37:00 A1.35E7
37:25 A1.66E7
380.9760 F:3 Expt: OCDD
34:39 34:56 35:06 35:24 35:31 35:56 36:08 36:18 36:41 37:06 37:14 37:23 37:33 37:57 38:16 38:30 38:46
1.5E6 1.2E6 8.8E5 5.9E5 2.9E5 0.0E0
1.2E6 9.4E5 7.1E5 4.7E5 2.4E5 0.0E0
4.9E6 3.9E6 2.9E6 2.0E6 9.8E5 0.0E0
3.9E6 3.1E6 2.3E6 1.6E6 7.8E5 0.0E0
4.3E7 3.4E7 2.6E7 1.7E7 8.6E6 0.0E0
100% 80 60 40 20 0
35:00 36:00 37:00 38:00 39:00 Time

File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

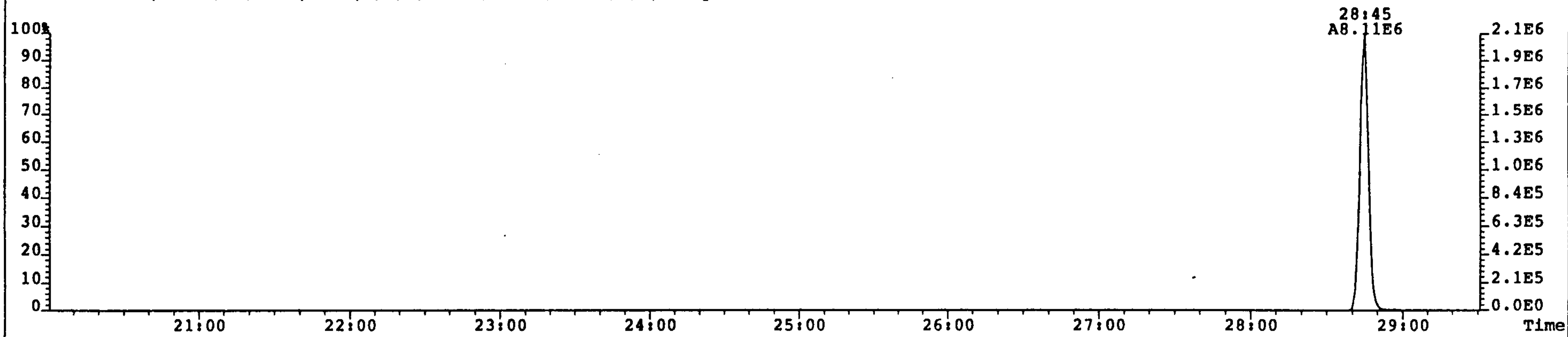


File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

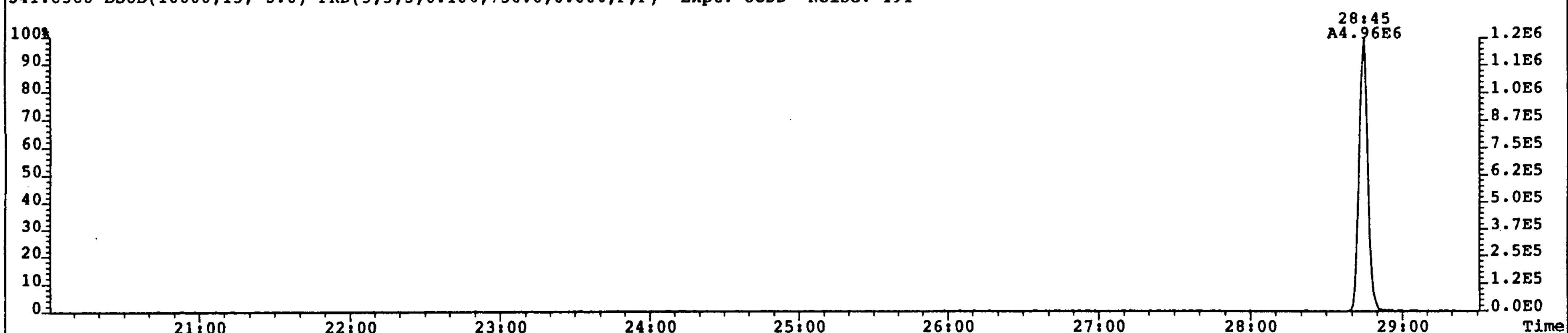



File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
303.9016 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 200
21:41
A5.88E5
26:45
A1.58E6
28:48
A1.72E6
305.8987 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 466
21:41
A8.04E5
26:44
A2.10E6
28:48
A2.21E6
315.9419 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 703
25:19
A3.28E7
26:43
A3.18E7
317.9389 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 911
25:19
A4.25E7
26:43
A4.02E7
375.8364 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 65
20:51
A1.18E3
22:41
A1.68E3
23:01
A1.63E3
23:24
23:44
A1.20E3
23:59
A570.12
27:32
A2.28E3
28:23
A1.38E3
28:46
A1.94E3
29:14
A1.27E3
Time

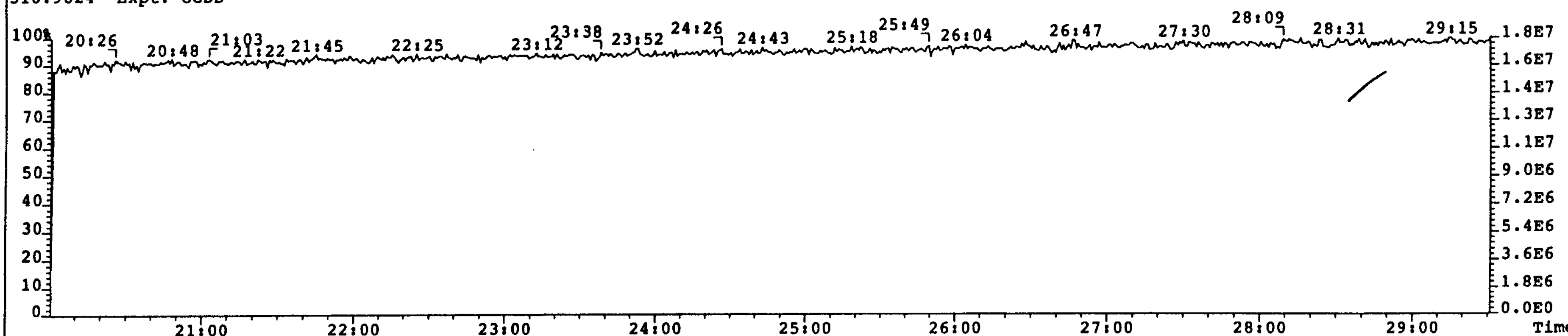
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 80



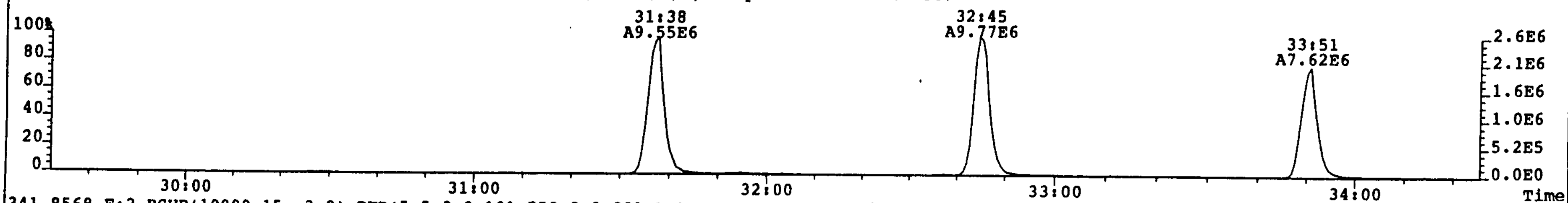

341.8568 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 191



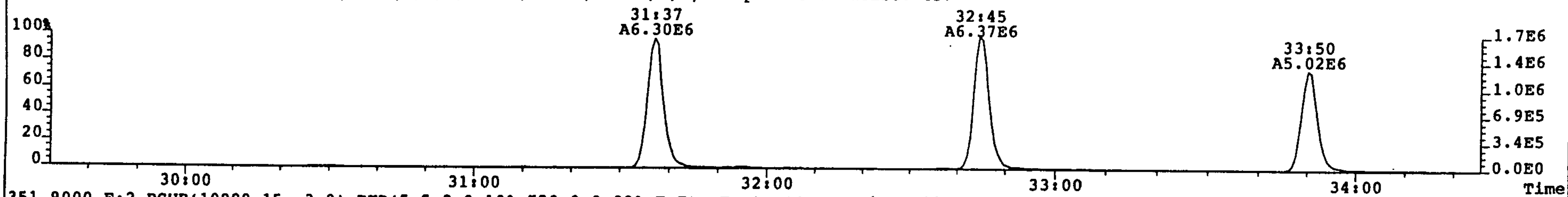

316.9824 Expt: OCDD



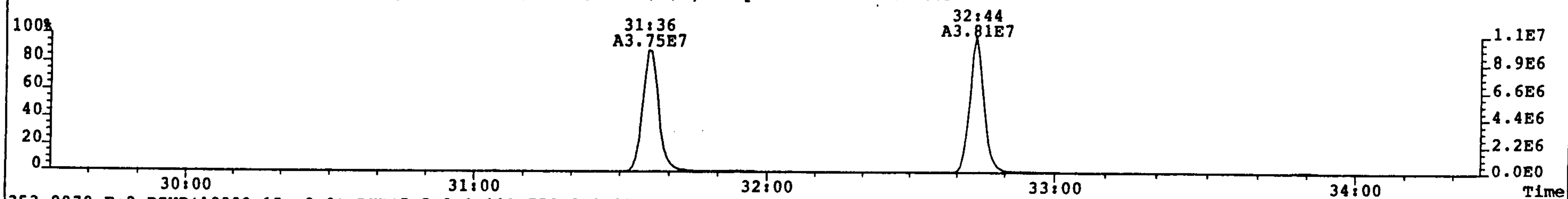
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 507



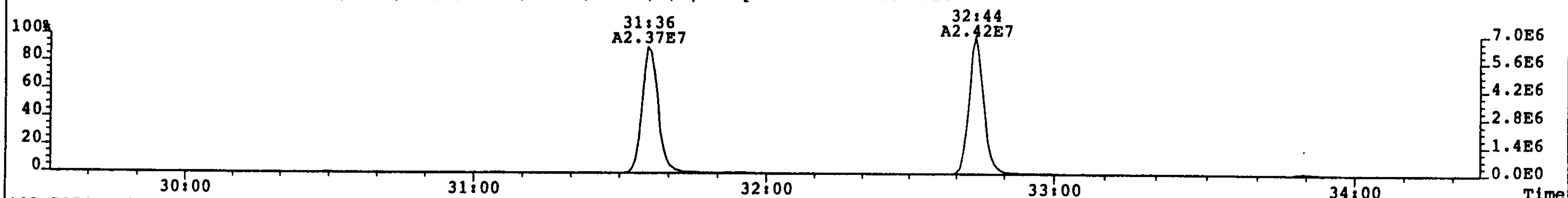

341.8568 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 457



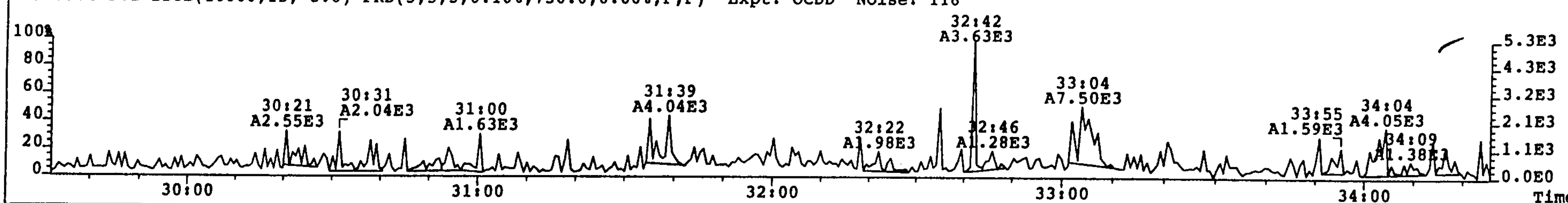

351.9000 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 665



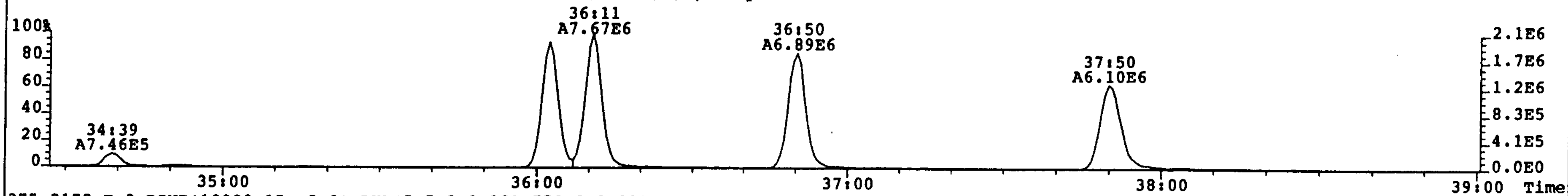

353.8970 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 714



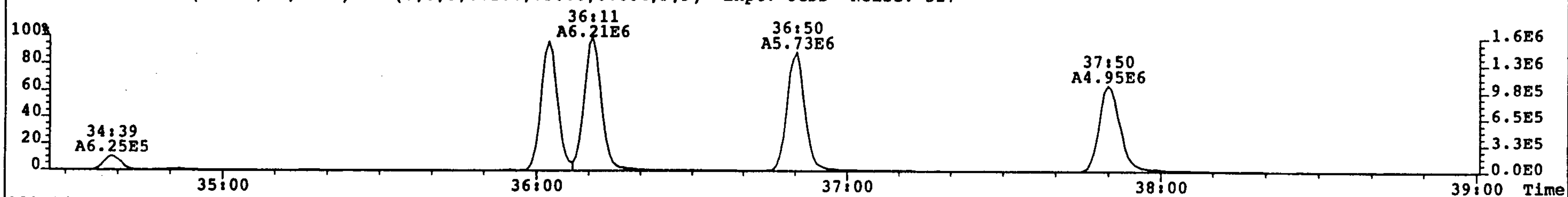

409.7974 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 116



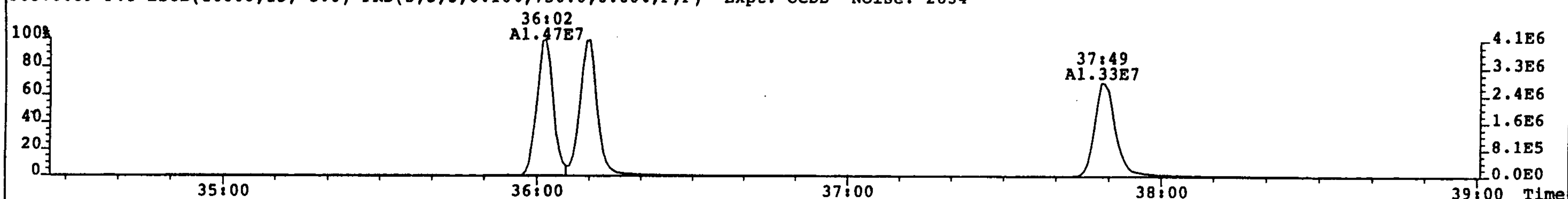
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
373.8207 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 572



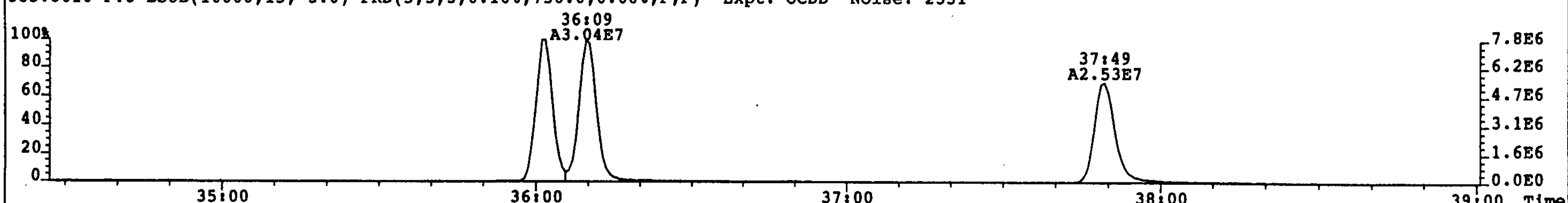

375.8178 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 527



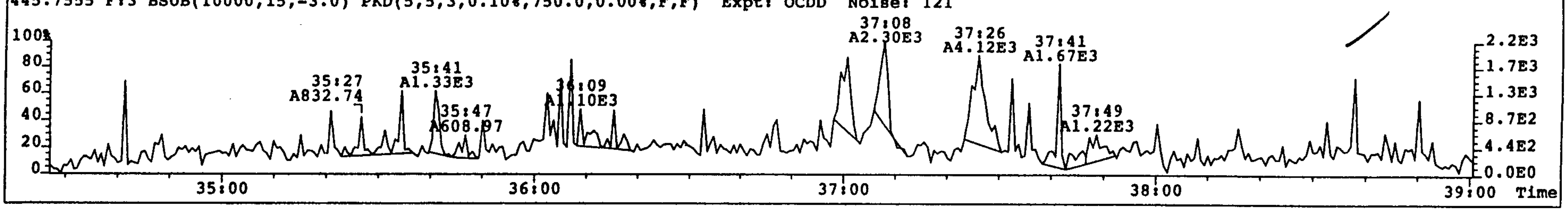

383.8639 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 2634



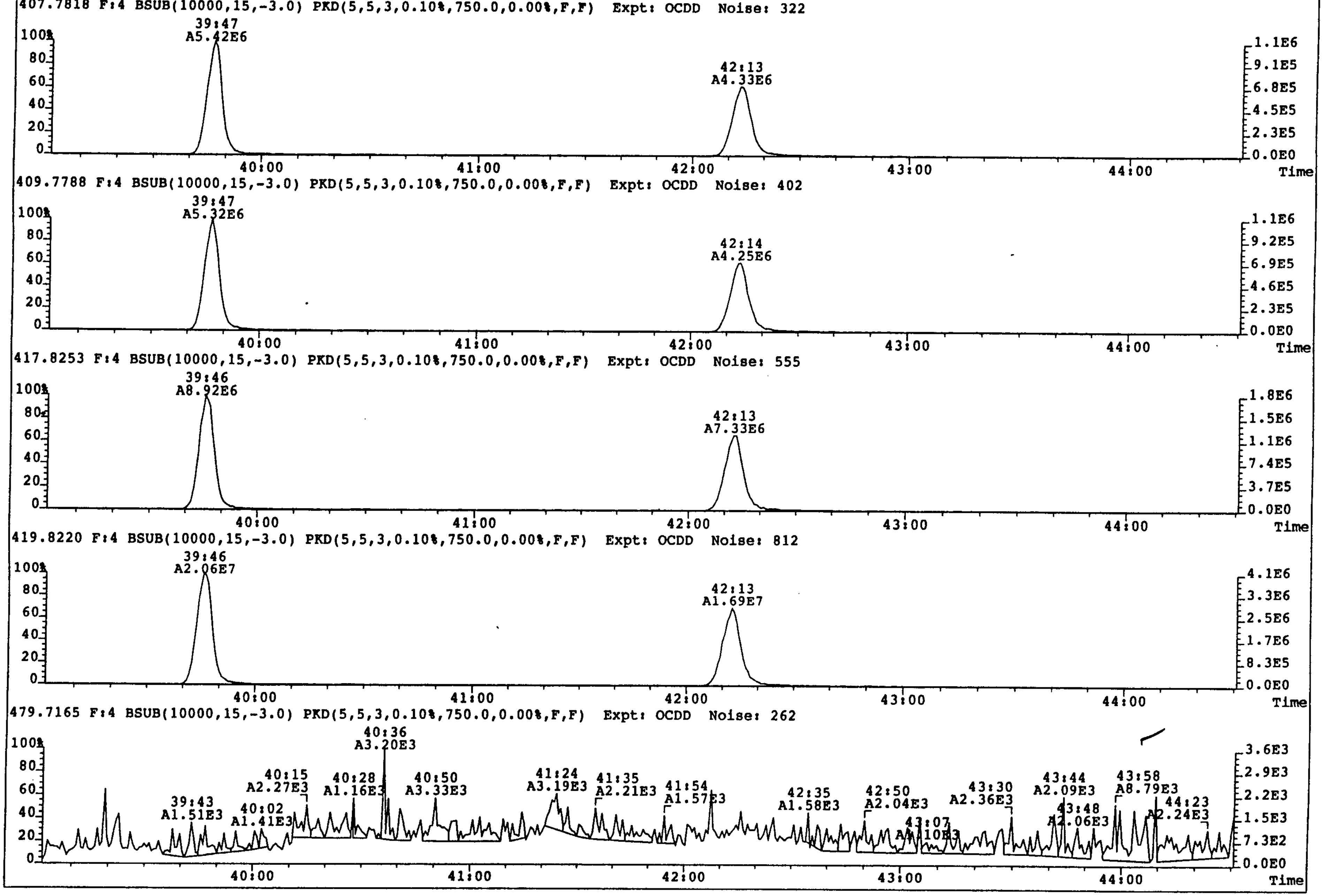

385.8610 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 2331



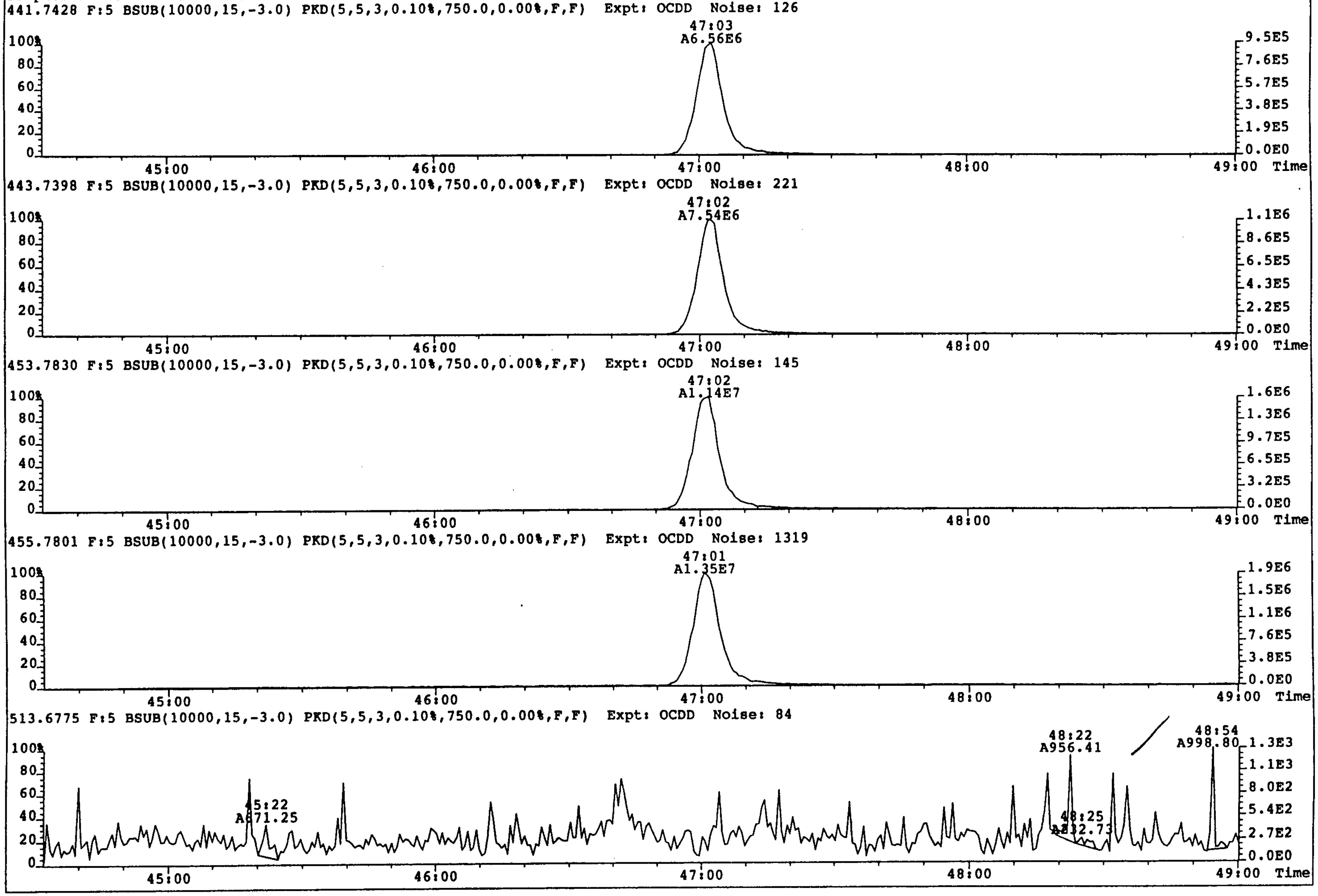

445.7555 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 121



File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



File: 010223P1  Acq: 23-FEB-2001 11:17:52  GC EI+ Voltage SIR  Autospec-UltimaE
Sample# 1  Text: DB5 CPSM / M23 CS3  Vial# 3  File Text: AAP DB5



45

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: Ce

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#4 Analysis Date: 23-FEB-01 Time: 13:52:50

| NATIVE ANALYTES | M/Z'S FORMING RATIO | ION ABUND. RATIO | QC LIMITS | Pass | CONC. FOUND | CONC. RANGE (ng/mL) |
|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | M/M+2 | 0.77 | 0.65-0.89 | y | 5.72 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDD | M+2/M+4 | 1.56 | 1.32-1.78 | y | 27.30 | 18.75-31.25 |
| 1,2,3,4,7,8-HxCDD | M+2/M+4 | 1.25 | 1.05-1.43 | y | 25.77 | 18.75-31.25 |
| 1,2,3,6,7,8-HxCDD | M+2/M+4 | 1.26 | 1.05-1.43 | y | 26.57 | 18.75-31.25 |
| 1,2,3,7,8,9-HxCDD | M+2/M+4 | 1.24 | 1.05-1.43 | y | 26.94 | 18.75-31.25 |
| 1,2,3,4,6,7,8-HpCDD | M+2/M+4 | 1.03 | 0.88-1.20 | y | 25.31 | 18.75-31.25 |
| OCDD | M+2/M+4 | 0.88 | 0.76-1.02 | y | 52.15 | 37 - 65 |
| 2,3,7,8-TCDF | M/M+2 | 0.74 | 0.65-0.89 | y | 4.75 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDF | M+2/M+4 | 1.54 | 1.32-1.78 | y | 25.15 | 18.75-31.25 |
| 2,3,4,7,8-PeCDF | M+2/M+4 | 1.52 | 1.32-1.78 | y | 25.03 | 18.75-31.25 |
| 1,2,3,4,7,8-HxCDF | M+2/M+4 | 1.23 | 1.05-1.43 | y | 24.69 | 18.75-31.25 |
| 1,2,3,6,7,8-HxCDF | M+2/M+4 | 1.22 | 1.05-1.43 | y | 24.52 | 18.75-31.25 |
| 2,3,4,6,7,8-HxCDF | M+2/M+4 | 1.22 | 1.05-1.43 | y | 24.09 | 18.75-31.25 |
| 1,2,3,7,8,9-HxCDF | M+2/M+4 | 1.22 | 1.05-1.43 | y | 24.33 | 18.75-31.25 |
| 1,2,3,4,6,7,8-HpCDF | M+2/M+4 | 1.02 | 0.88-1.20 | y | 24.26 | 18.75-31.25 |
| 1,2,3,4,7,8,9-HpCDF | M+2/M+4 | 1.02 | 0.88-1.20 | y | 23.32 | 18.75-31.25 |
| OCDF | M+2/M+4 | 0.89 | 0.76-1.02 | y | 49.06 | 35 - 65 |

Analyst: GAG

Date: 23 Feb 01

# PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Reviewer: Cl

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#4 Analysis Date: 23-FEB-01 Time: 13:52:50

| LABELED COMPOUNDS | M/Z'S FORMING RATIO | ION ABUND. RATIO | QC LIMITS | Pass | CONC. FOUND | CONC. RANGE (ng/mL) |
|---|---|---|---|---|---|---|
| 13C-2,3,7,8-TCDD | M/M+2 | 0.79 | 0.65-0.89 | y | 95.0 | 70.0 - 130.0 |
| 13C-1,2,3,7,8-PeCDD | M+2/M+4 | 1.56 | 1.32-1.78 | y | 103.9 | 70.0 - 130.0 |
| 13C-1,2,3,6,7,8-HxCDD | M+2/M+4 | 1.25 | 1.05-1.43 | y | 92.4 | 70.0 - 130.0 |
| 13C-1,2,3,4,6,7,8-HpCDD | M+2/M+4 | 1.05 | 0.88-1.20 | y | 90.4 | 70.0 - 130.0 |
| 13C-OCDD | M+2/M+4 | 0.89 | 0.76-1.02 | y | 86.6 | 70.0 - 130.0 |
| 13C-2,3,7,8-TCDF | M/M+2 | 0.79 | 0.65-0.89 | y | 93.0 | 70.0 - 130.0 |
| 13C-1,2,3,7,8-PeCDF | M+2/M+4 | 1.59 | 1.32-1.78 | y | 90.3 | 70.0 - 130.0 |
| 13C-1,2,3,6,7,8-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 87.7 | 70.0 - 130.0 |
| 13C-1,2,3,4,6,7,8-HpCDF | M/M+2 | 0.45 | 0.37-0.51 | y | 82.1 | 70.0 - 130.0 |
| 13C-OCDF | M+2/M+4 | 0.88 | 0.76-1.02 | y | 82.4 | 70.0 - 130.0 |
| | | | | | | |
| 37Cl-2,3,7,8-TCDD | | | | | 107.3 | 75.0 - 125.0 |
| 13C-2,3,4,7,8-PeCDF | M+2/M+4 | 1.56 | 1.32-1.78 | y | 104.8 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8-HxCDD | M+2/M+4 | 1.26 | 1.05-1.43 | y | 102.4 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 105.0 | 75.0 - 125.0 |
| 13C-1,2,3,4,7,8,9-HpCDF | M/M+2 | 0.44 | 0.37-0.51 | y | 100.7 | 75.0 - 125.0 |
| | | | | | | |
| 13C-1,2,3,7,8,9-HxCDF | M/M+2 | 0.52 | 0.43-0.59 | y | 90.8 | 75.0 - 125.0 |

Analyst: GAG

Date: 24 Feb 01

Client ID: DB5 CPSM / M23 CS3 Filename: 010223P1 S: 4 Acq: 23-FEB-01 13:52:50 ConCal: 010223P1- 
Lab ID: CS3RC GC Column ID: db-5 ICal: MM1_M23_0: wt/vol: 1.000 EndCal: 010223P1-

Reviewer: C

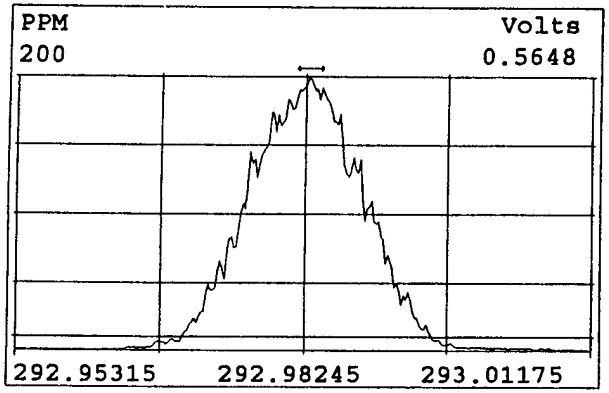
Date: 24 Feb 01

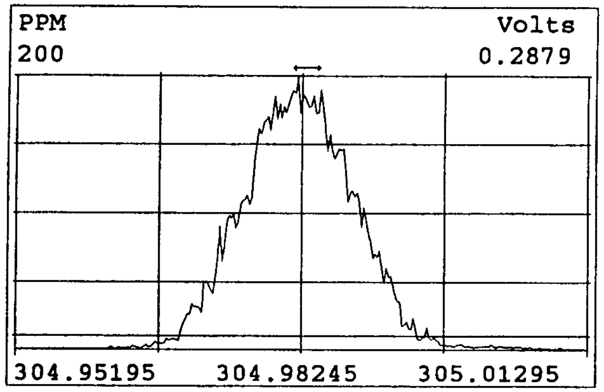
| | Name | Resp | RA | RRF | RT | Conc | Qualif. | CDE | noise | Fac | DL | EMPC / Rec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2,3,7,8-TCDD | 4.69e+06 | 0.77 y | 1.26 | 27:38 | 5.72 | | | 858 | 2.5 | 0.0191 | |
| | 1,2,3,7,8-PeCDD | 1.60e+07 | 1.56 y | 1.01 | 33:06 | 27.3 | | | 311763 | 2.5 | 12.4 | |
| | 1,2,3,4,7,8-HxCDD | 1.43e+07 | 1.25 y | 1.14 | 37:00 | 25.8 | | | 2428 | 2.5 | 0.101 | |
| | 1,2,3,6,7,8-HxCDD | 1.32e+07 | 1.26 y | 1.02 | 37:07 | 26.6 | | | 2428 | 2.5 | 0.112 | |
| | 1,2,3,7,8,9-HxCDD | 1.50e+07 | 1.24 y | 1.14 | 37:26 | 26.9 | | | 2428 | 2.5 | 0.101 | |
| | 1,2,3,4,6,7,8-HpCDD | 1.32e+07 | 1.03 y | 1.13 | 41:23 | 25.3 | | | 2494 | 2.5 | 0.157 | |
| | OCDD | 1.92e+07 | 0.88 y | 1.03 | 46:41 | 52.1 | | | 850 | 2.5 | 0.0960 | |
| | 2,3,7,8-TCDF | 4.36e+06 | 0.74 y | 1.05 | 26:44 | 4.75 | | | 1265 | 2.5 | 0.0266 | |
| | 1,2,3,7,8-PeCDF | 2.01e+07 | 1.54 y | 1.04 | 31:37 | 25.2 | | | 8276 | 2.5 | 0.252 | |
| | 2,3,4,7,8-PeCDF | 2.03e+07 | 1.52 y | 1.05 | 32:44 | 25.0 | | | 8276 | 2.5 | 0.248 | |
| | 1,2,3,4,7,8-HxCDF | 1.77e+07 | 1.23 y | 1.13 | 36:01 | 24.7 | | | 3215 | 2.5 | 0.0651 | |
| | 1,2,3,6,7,8-HxCDF | 1.92e+07 | 1.22 y | 1.24 | 36:10 | 24.5 | | | 3215 | 2.5 | 0.0595 | |
| | 2,3,4,6,7,8-HxCDF | 1.78e+07 | 1.22 y | 1.16 | 36:49 | 24.1 | | | 3215 | 2.5 | 0.0633 | |
| | 1,2,3,7,8,9-HxCDF | 1.57e+07 | 1.22 y | 1.02 | 37:49 | 24.3 | | | 3215 | 2.5 | 0.0724 | |
| | 1,2,3,4,6,7,8-HpCDF | 1.56e+07 | 1.02 y | 1.54 | 39:46 | 24.3 | | | 3299 | 2.5 | 0.101 | |
| | 1,2,3,4,7,8,9-HpCDF | 1.27e+07 | 1.02 y | 1.30 | 42:12 | 23.3 | | | 3299 | 2.5 | 0.120 | |
| | OCDF | 2.12e+07 | 0.89 y | 1.15 | 47:01 | 49.1 | | | 1780 | 2.5 | 0.160 | |
| | | | | | | | | | | | | EMPC |
| | Total Tetra-Dioxins | 1.86e+07 | 0.77 y | 1.26 | 23:52 | 22.6 | | | 858 | 2.5 | 0.0191 | 22.8 |
| | Total Penta-Dioxins | 4.20e+07 | 1.56 y | 1.01 | 30:33 | 71.5 | | | 311763 | 2.5 | 12.4 | 71.5 |
| | Total Hexa-Dioxins | 4.40e+07 | 1.24 y | 1.10 | 35:18 | 82.2 | | | 2428 | 2.5 | 0.104 | 82.7 |
| | Total Hepta-Dioxins | 2.44e+07 | 1.03 y | 1.13 | 40:12 | 46.8 | | | 2494 | 2.5 | 0.157 | 47.0 |
| | Total Tetra-Furans | 1.10e+07 | 0.72 y | 1.05 | 21:10 | 12.0 | | | 1265 | 2.5 | 0.0266 | 12.3 |
| | 1st Fnc. Penta-Furans | 1.65e+07 | 1.62 y | 1.05 | 28:44 | 20.5 | | | 4541 | 2.5 | 0.137 | 20.5 |
| | Total Penta-Furans | 5.74e+07 | 1.54 y | 1.05 | 31:37 | 71.4 | | | 8276 | 2.5 | 0.250 | |
| | PeCDF Totals: | | | | | 91.9 | | | | | | 92.2 |
| | Total Hexa-Furans | 7.24e+07 | 1.26 y | 1.14 | 34:38 | 100 | | | 3215 | 2.5 | 0.0647 | 101 |
| | Total Hepta-Furans | 2.83e+07 | 1.02 y | 1.42 | 39:46 | 47.6 | | | 3299 | 2.5 | 0.109 | 48.2 |
| | | | | | | | | | | | | Rec |
| IS | 13C-2,3,7,8-TCDD | 6.50e+07 | 0.79 y | 1.13 | 27:36 | 95.0 | | | | | | 95.0 |
| IS | 13C-1,2,3,7,8-PeCDD | 5.80e+07 | 1.56 y | 0.93 | 33:04 | 104 | | | | | | 104 |
| IS | 13C-1,2,3,6,7,8-HxCDD | 4.86e+07 | 1.25 y | 0.93 | 37:06 | 92.4 | | | | | | 92.4 |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.61e+07 | 1.05 y | 0.91 | 41:22 | 90.4 | | | | | | 90.4 |
| IS | 13C-OCDD | 3.58e+07 | 0.89 y | 0.73 | 46:40 | 86.6 | | | | | | 86.6 |
| IS | 13C-2,3,7,8-TCDF | 8.76e+07 | 0.79 y | 1.06 | 26:43 | 93.0 | | | | | | 93.0 |
| IS | 13C-1,2,3,7,8-PeCDF | 7.68e+07 | 1.59 y | 0.96 | 31:36 | 90.3 | | | | | | 90.3 |
| IS | 13C-1,2,3,6,7,8-HxCDF | 6.34e+07 | 0.52 y | 1.28 | 36:09 | 87.7 | | | | | | 87.7 |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 4.18e+07 | 0.45 y | 0.90 | 39:45 | 82.1 | | | | | | 82.1 |
| IS | 13C-OCDF | 3.77e+07 | 0.88 y | 0.81 | 47:00 | 82.4 | | | | | | 82.4 |
| RS/RT | 13C-1,2,3,4-TCDD | 6.03e+07 | 0.82 y | 1.00 | 26:56 | 100 | | | | | | - |
| RS | 13C-1,2,3,4-TCDF | 8.88e+07 | 0.77 y | 1.00 | 25:19 | 100 | | | | | | - |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD | 5.64e+07 | 1.27 y | 1.00 | 37:25 | 100 | | | | | | - |
| PS | 37Cl-2,3,7,8-TCDD | 3.59e+07 | | 0.51 | 27:38 | 107 | | | | | | 107 |
| PS | 13C-2,3,4,7,8-PeCDF | 7.84e+07 | 1.56 y | 0.97 | 32:43 | 105 | | | | | | 105 |
| PS | 13C-1,2,3,4,7,8-HxCDD | 4.59e+07 | 1.26 y | 0.92 | 36:59 | 102 | | | | | | 102 |
| PS | 13C-1,2,3,4,7,8-HxCDF | 6.05e+07 | 0.52 y | 0.91 | 36:00 | 105 | | | | | | 105 |
| PS | 13C-1,2,3,4,7,8,9-HpCDF | 3.59e+07 | 0.44 y | 0.85 | 42:11 | 101 | | | | | | 101 |
| AS | 13C-1,2,3,7,8,9-HxCDF | 5.47e+07 | 0.52 y | 1.07 | 37:49 | 90.8 | | | | | | 90.8 |

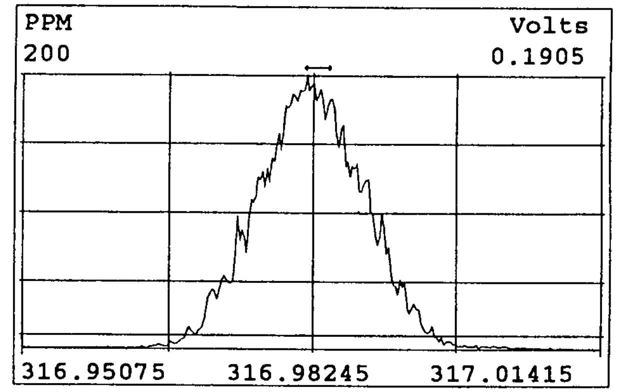
Analyst: SAG

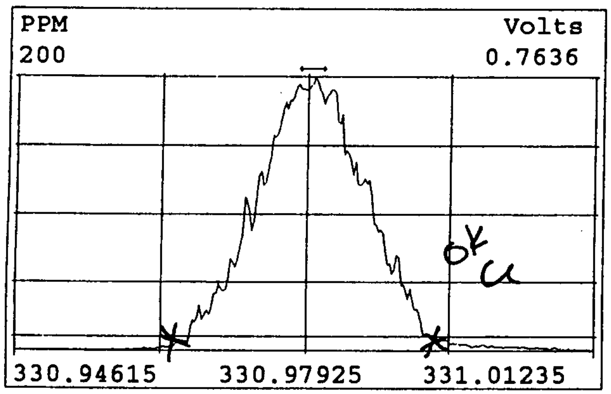
Date: 24Feb01

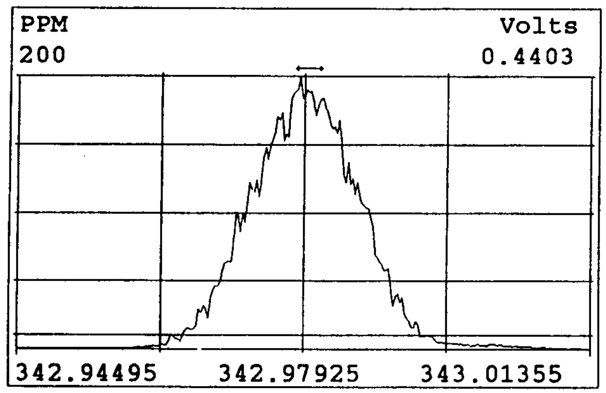
Peak Locate Examination:23-FEB-2001:14:59 File:RES_CHECK
Experiment:OCDD Function:1 Reference:PFK2

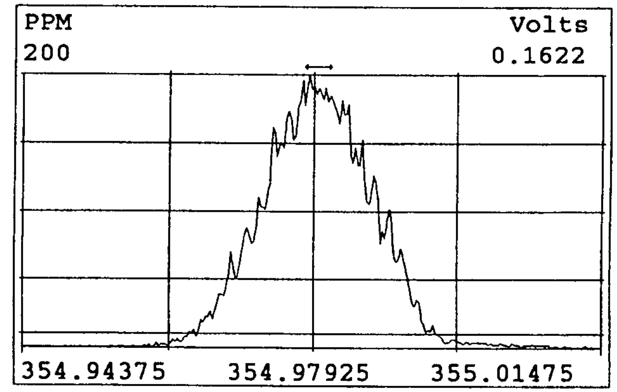


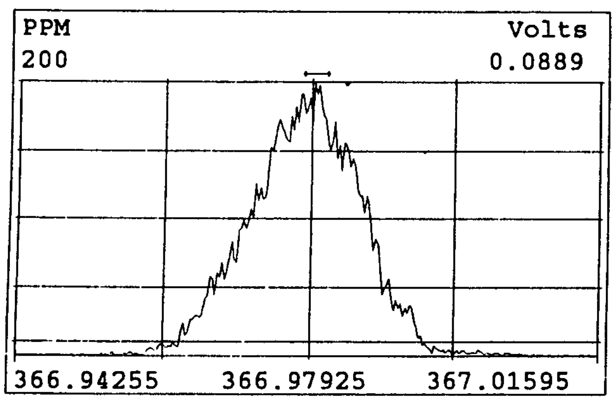



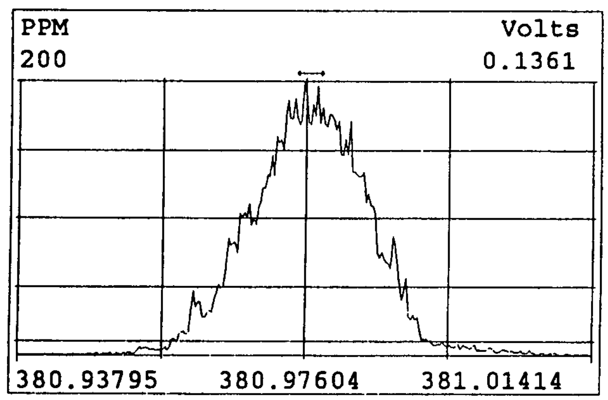



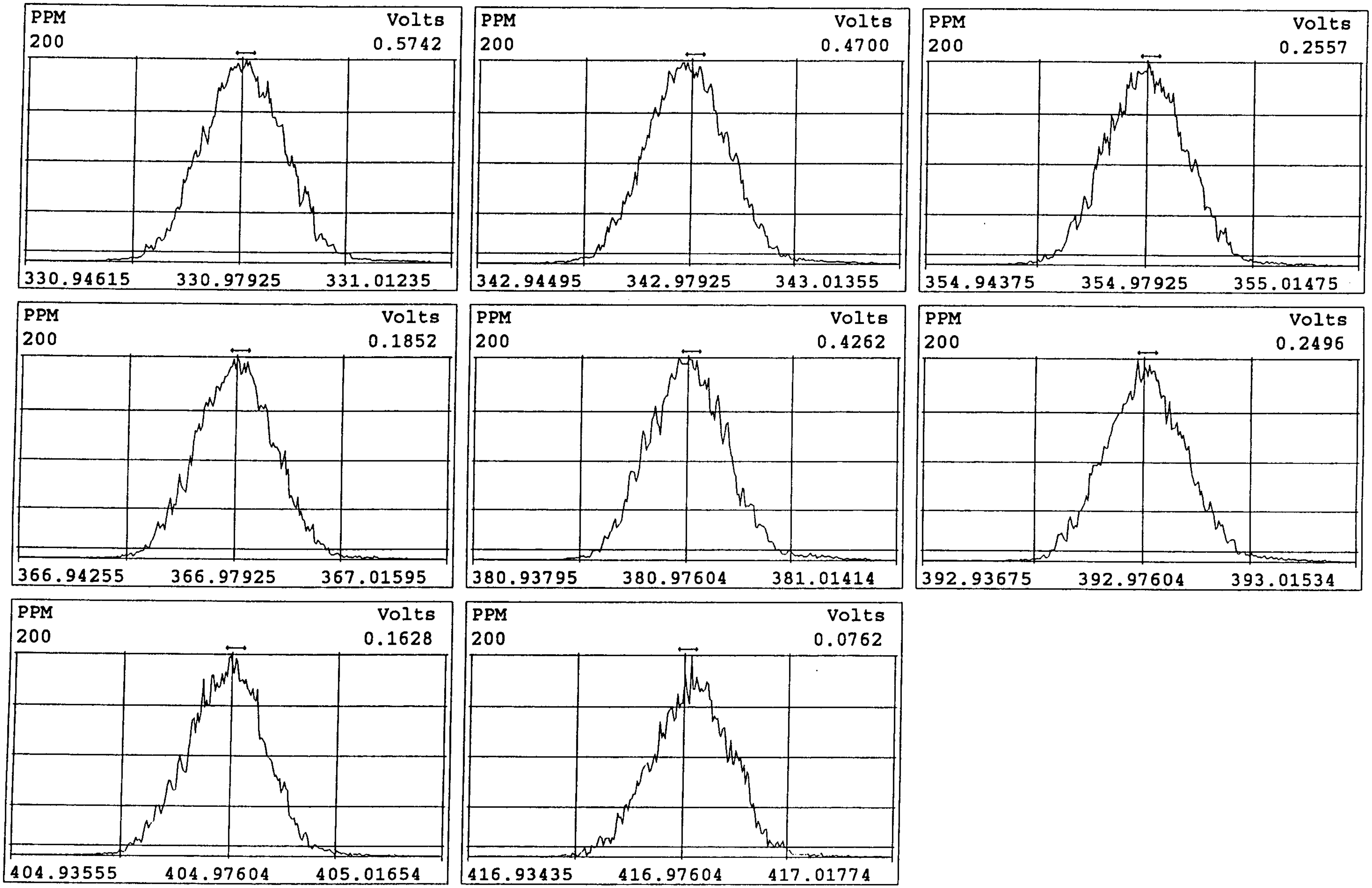



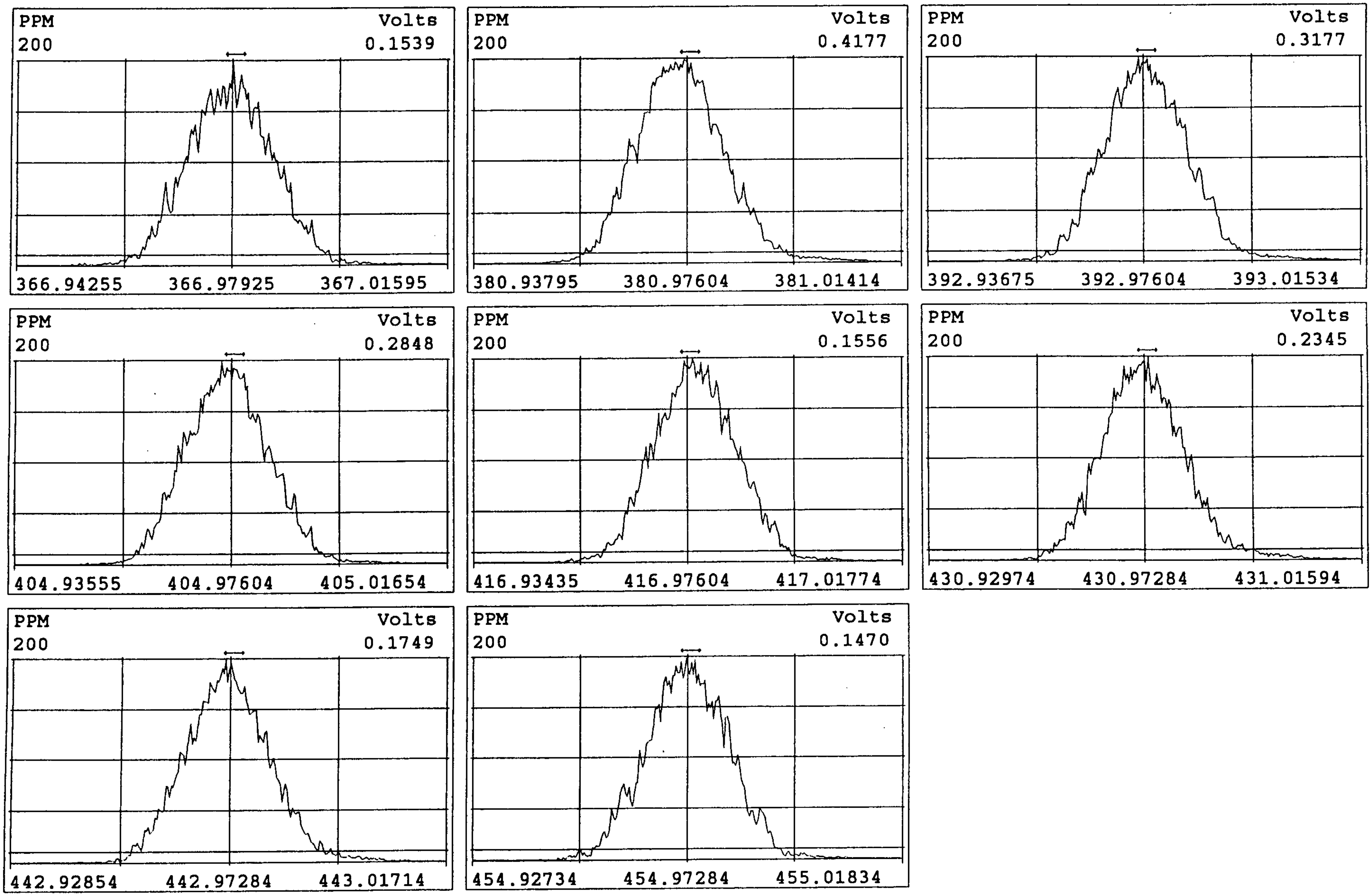



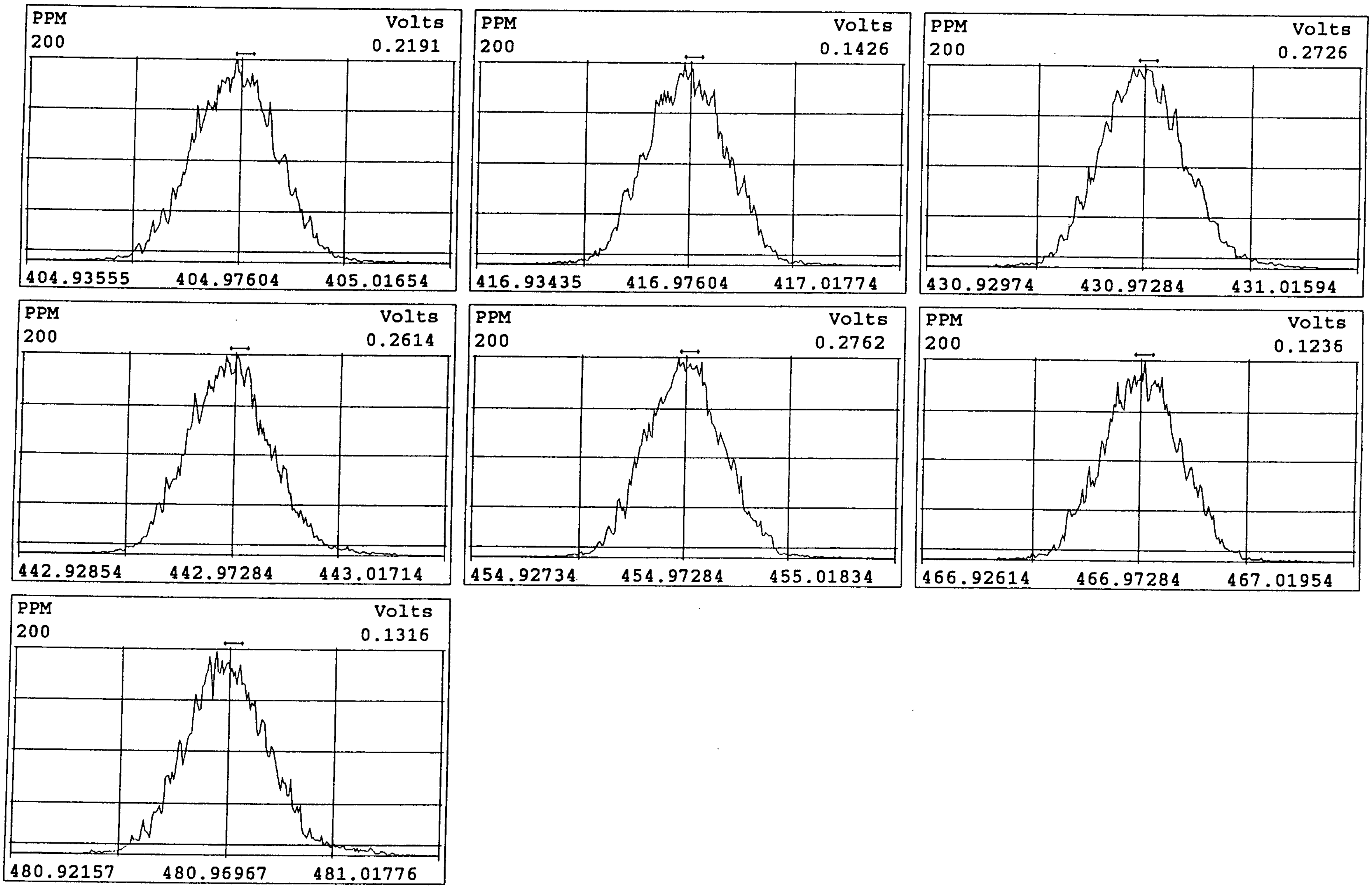
Peak Locate Examination:23-FEB-2001:15:00 File:RES_CHECK
Experiment:OCDD Function:2 Reference:PFK2



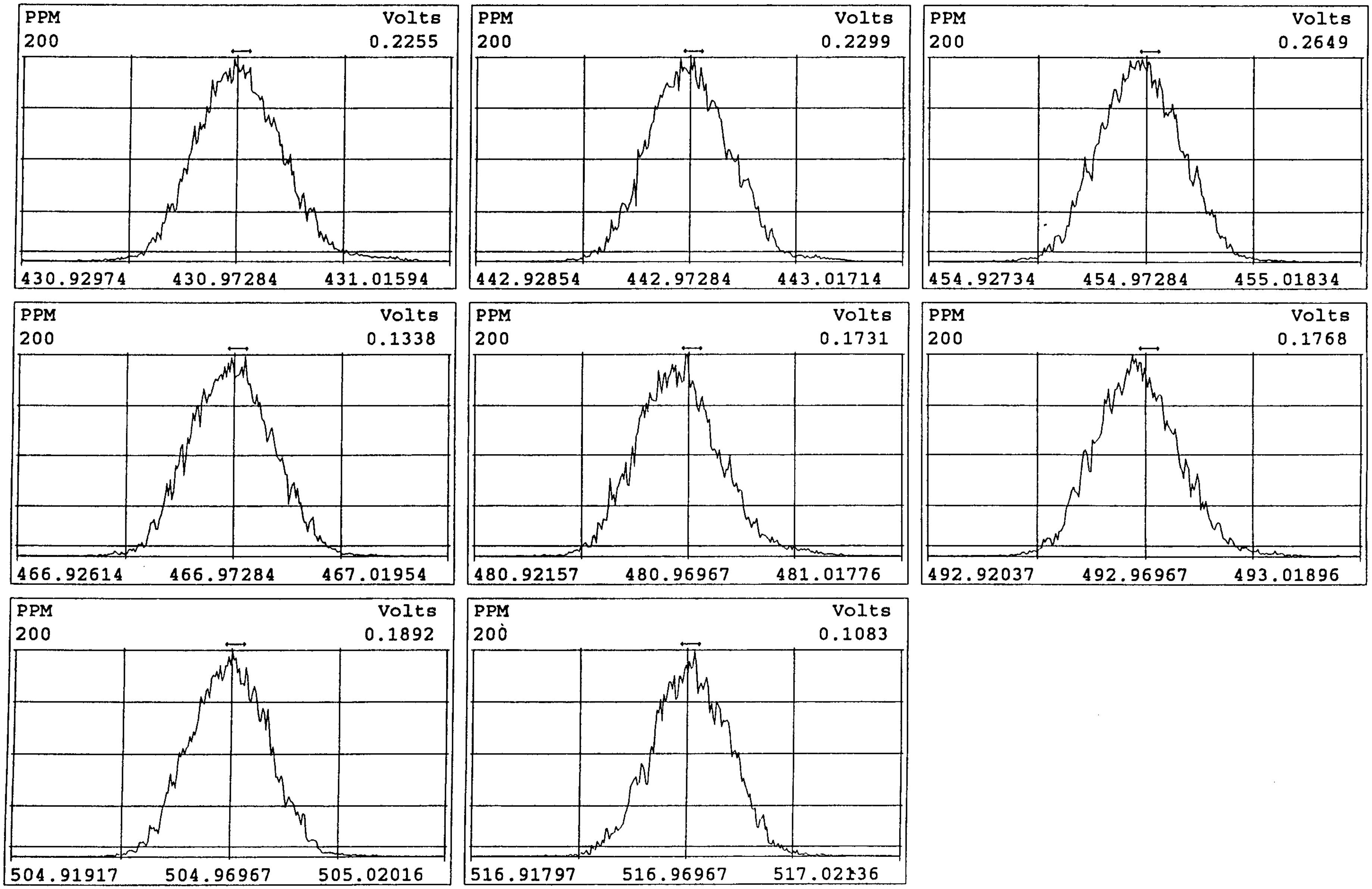
Peak Locate Examination:23-FEB-2001:15:00 File:RES_CHECK
Experiment:OCDD Function:3 Reference:PFK2

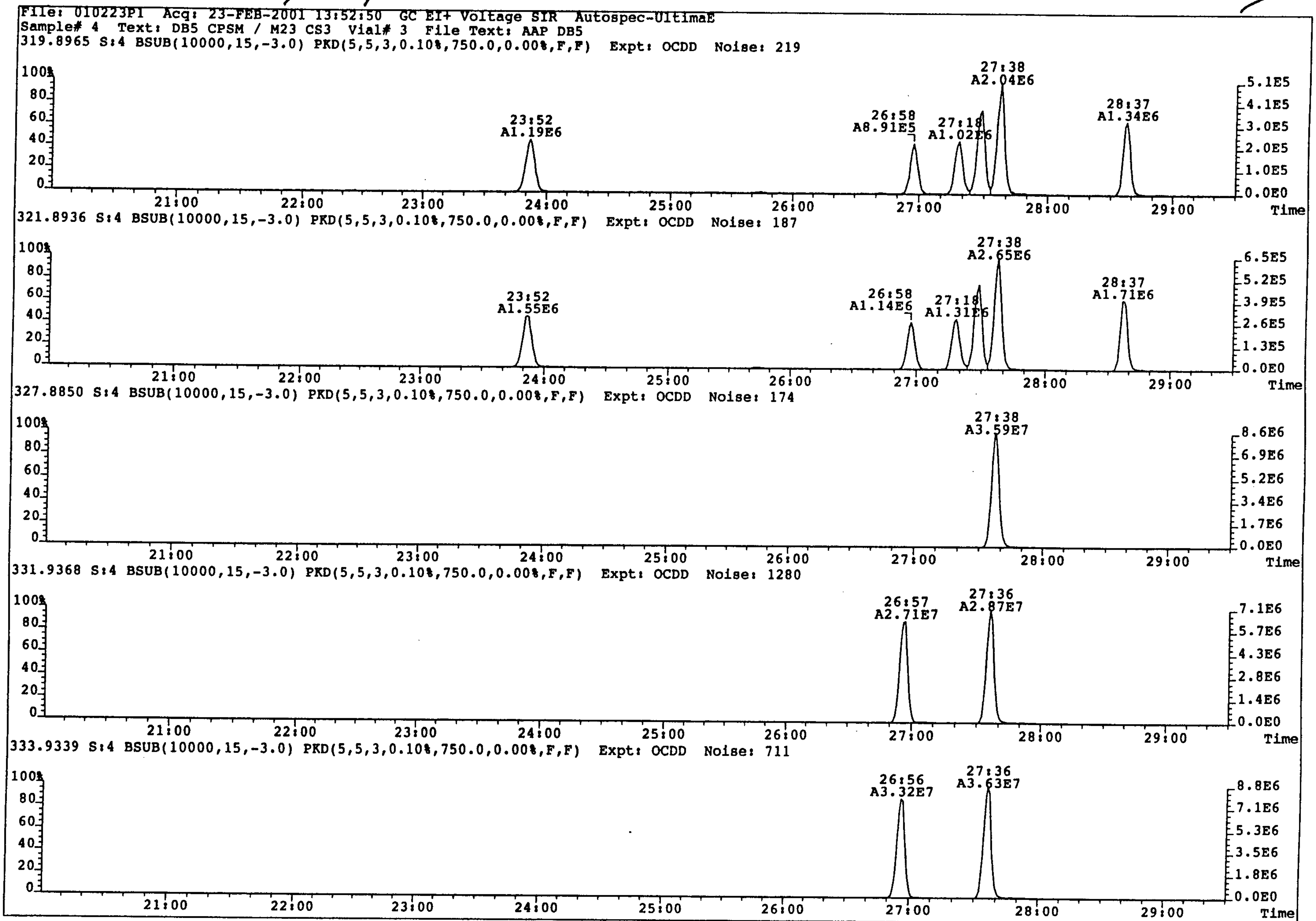


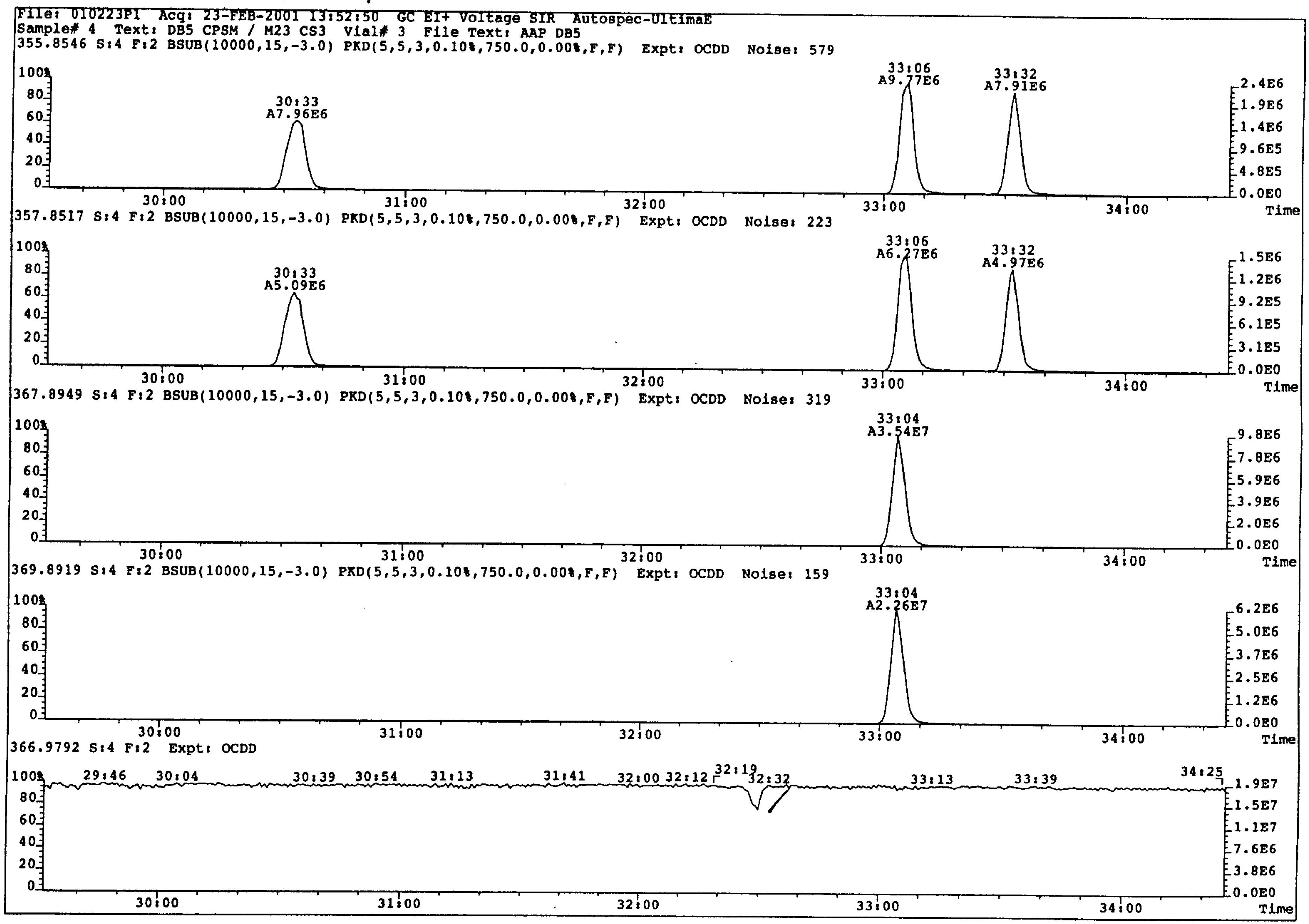
Peak Locate Examination:23-FEB-2001:15:00 File:RES_CHECK
Experiment:OCDD Function:4 Reference:PFK2



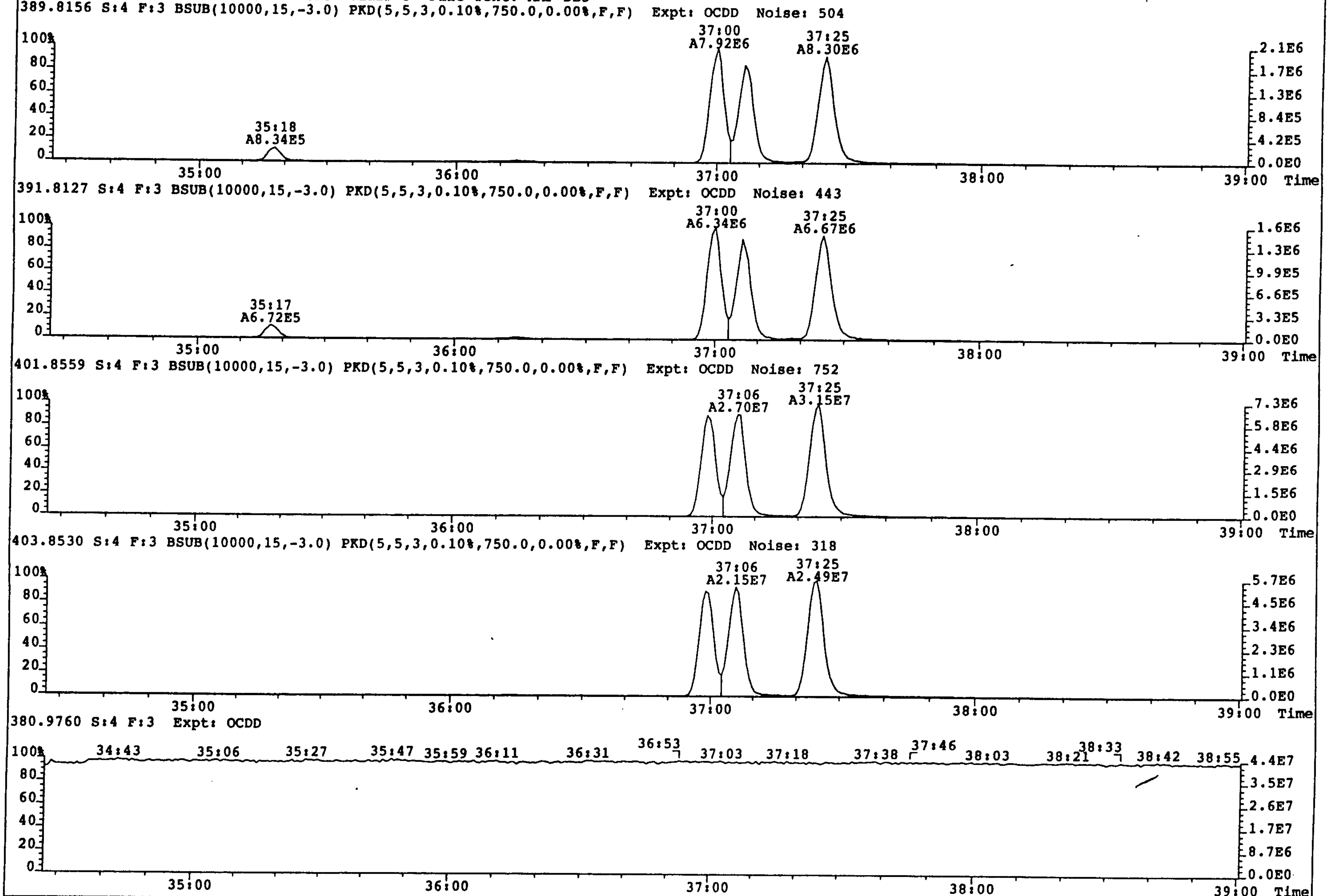
Peak Locate Examination:23-FEB-2001:15:01 File:RES_CHECK
Experiment:OCDD Function:5 Reference:PFK2



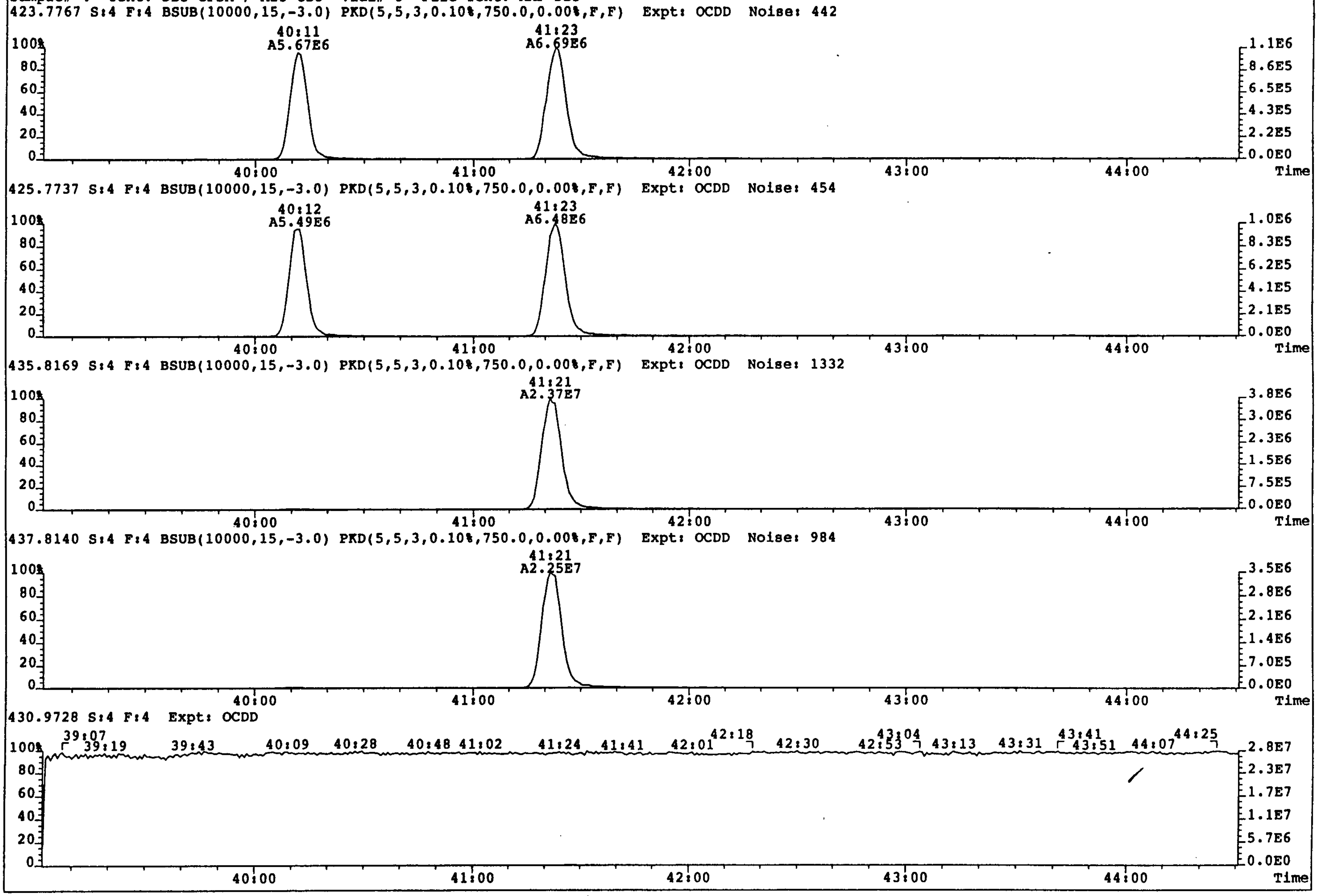

File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
319.8965 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 219
23:52
A1.19E6
26:58
A8.91E5
27:18
A1.02E6
27:38
A2.04E6
28:37
A1.34E6
321.8936 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 187
23:52
A1.55E6
26:58
A1.14E6
27:18
A1.31E6
27:38
A2.65E6
28:37
A1.71E6
327.8850 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 174
27:38
A3.59E7
331.9368 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1280
26:57
A2.71E7
27:36
A2.87E7
333.9339 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 711
26:56
A3.32E7
27:36
A3.63E7
Time


File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
355.8546 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 579
30:33
A7.96E6
33:06
A9.77E6
33:32
A7.91E6
357.8517 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 223
30:33
A5.09E6
33:06
A6.27E6
33:32
A4.97E6
367.8949 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 319
33:04
A3.54E7
369.8919 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 159
33:04
A2.26E7
366.9792 S:4 F:2 Expt: OCDD
29:46 30:04 30:39 30:54 31:13 31:41 32:00 32:12 32:19 32:32 33:13 33:39 34:25
100%
80
60
40
20
0
30:00
31:00
32:00
33:00
34:00
Time
2.4E6 1.9E6 1.4E6 9.6E5 4.8E5 0.0E0
1.5E6 1.2E6 9.2E5 6.1E5 3.1E5 0.0E0
9.8E6 7.8E6 5.9E6 3.9E6 2.0E6 0.0E0
6.2E6 5.0E6 3.7E6 2.5E6 1.2E6 0.0E0
1.9E7 1.5E7 1.1E7 7.6E6 3.8E6 0.0E0

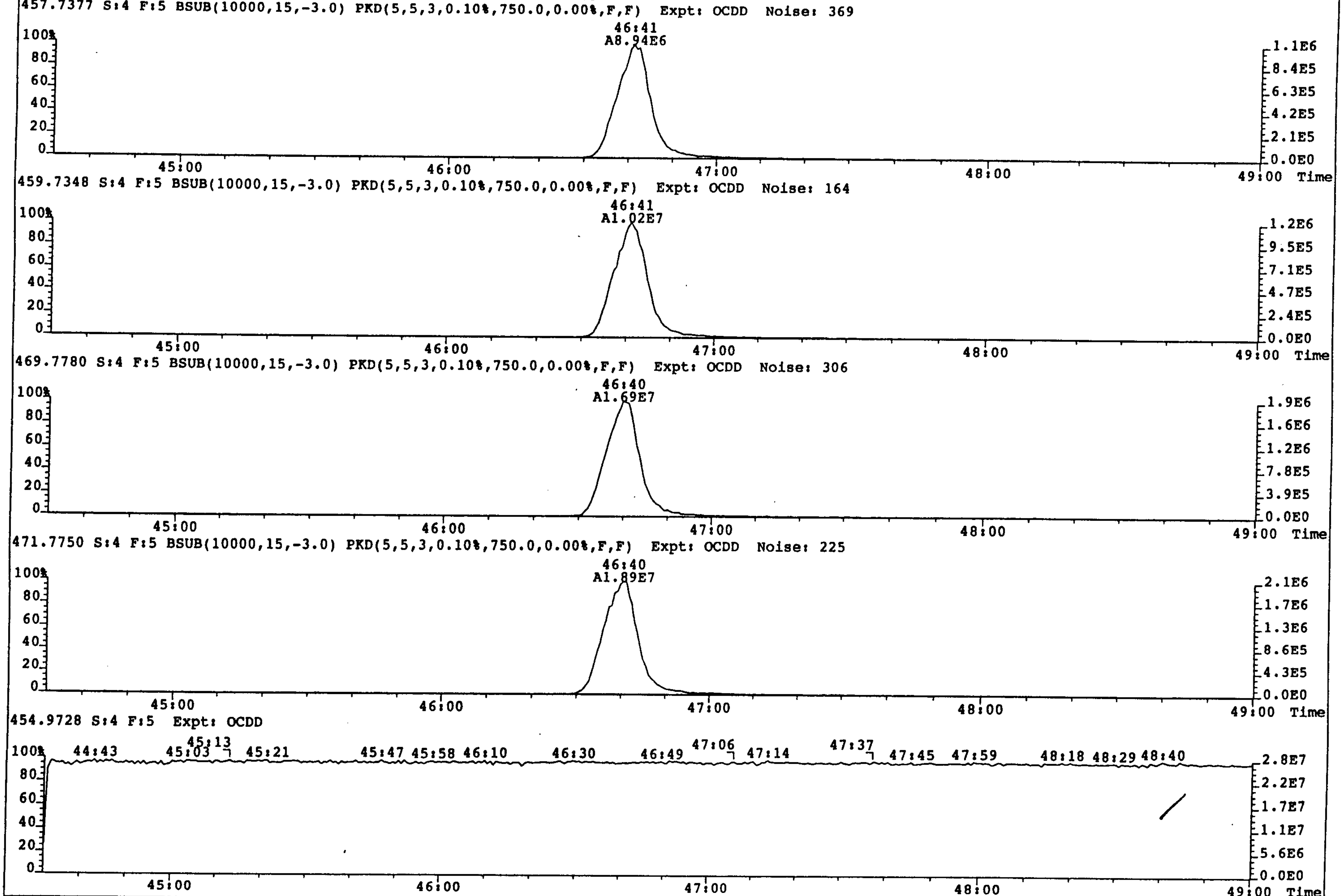
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



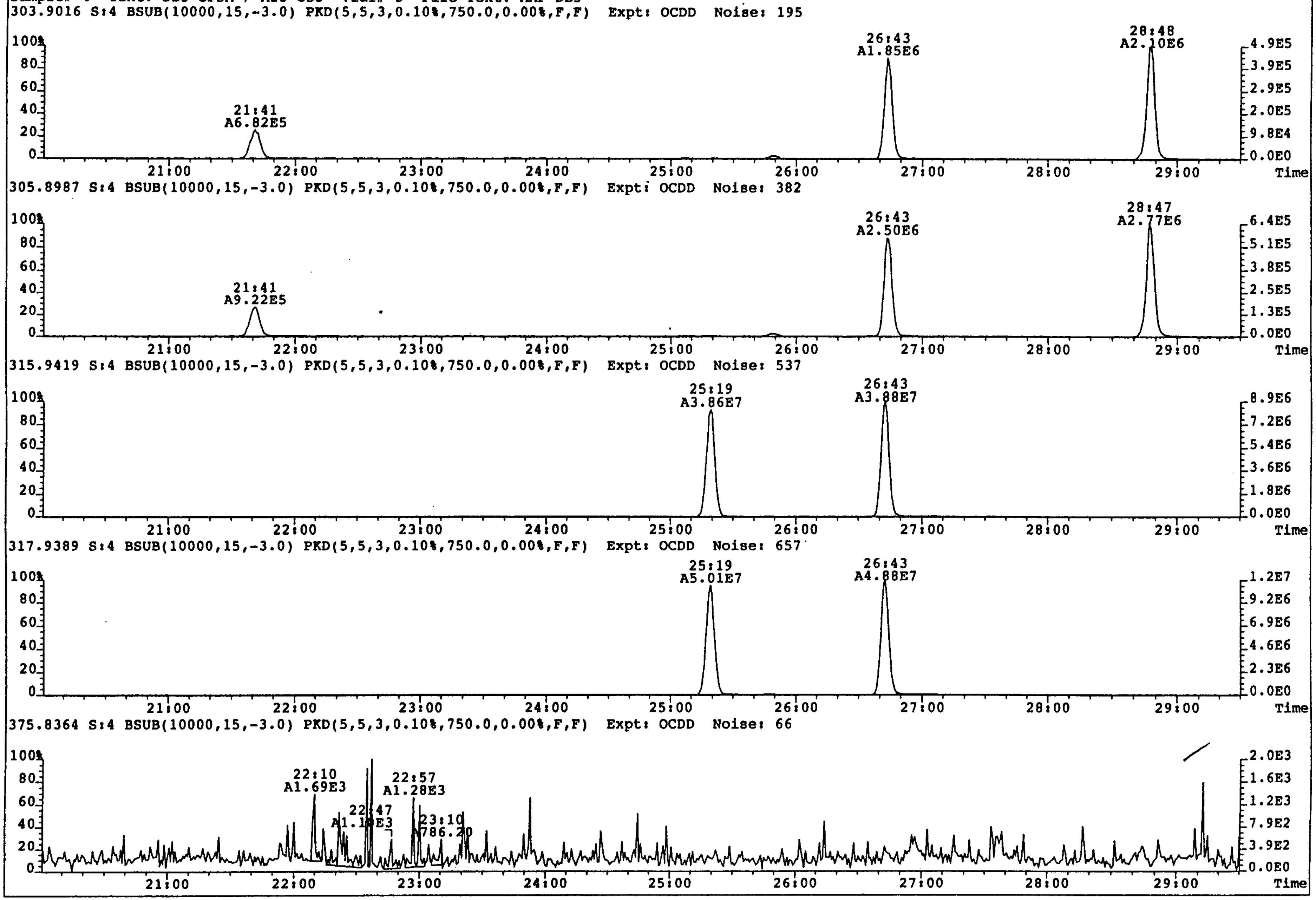
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



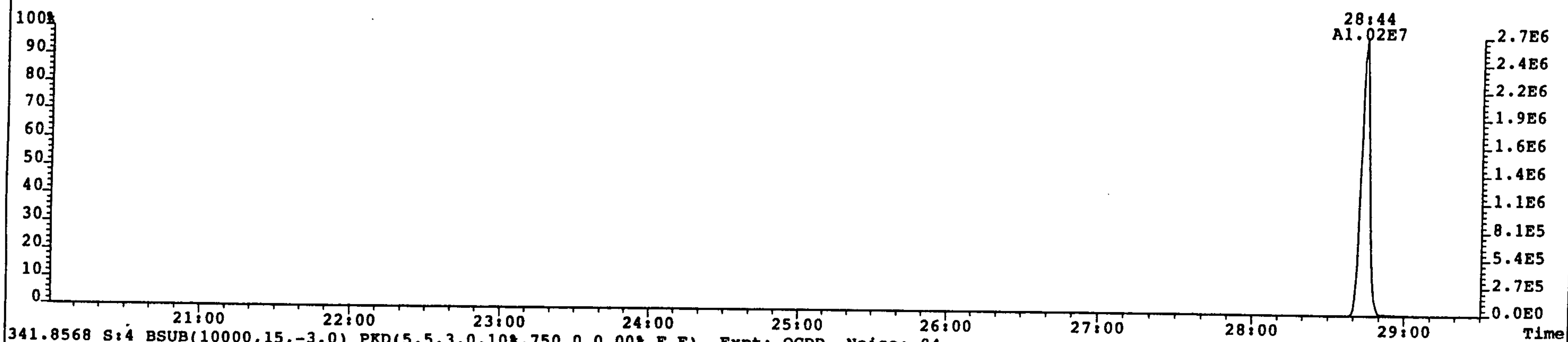
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



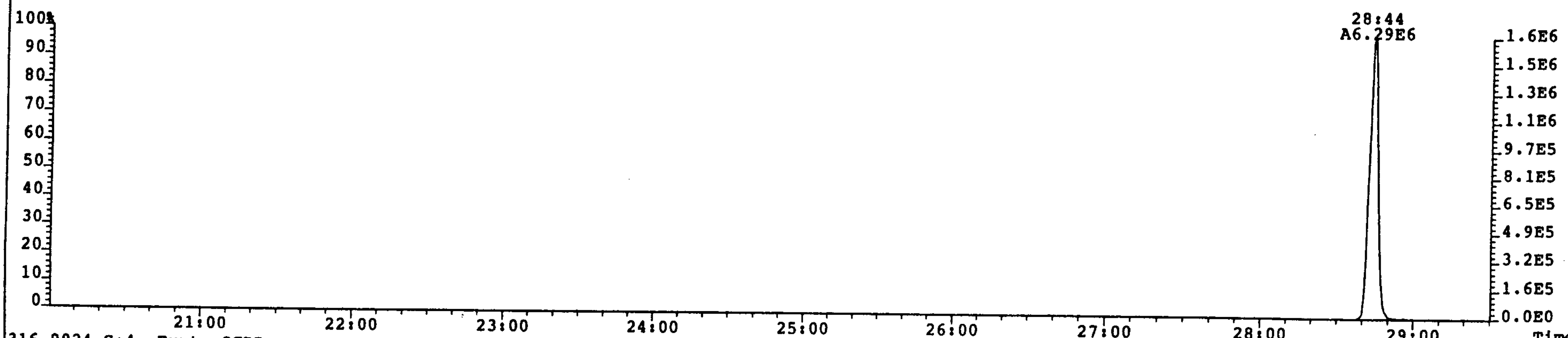
File: 010223P1  Acq: 23-FEB-2001 13:52:50  GC EI+ Voltage SIR  Autospec-UltimaE
Sample# 4  Text: DB5 CPSM / M23 CS3  Vial# 3  File Text: AAP DB5



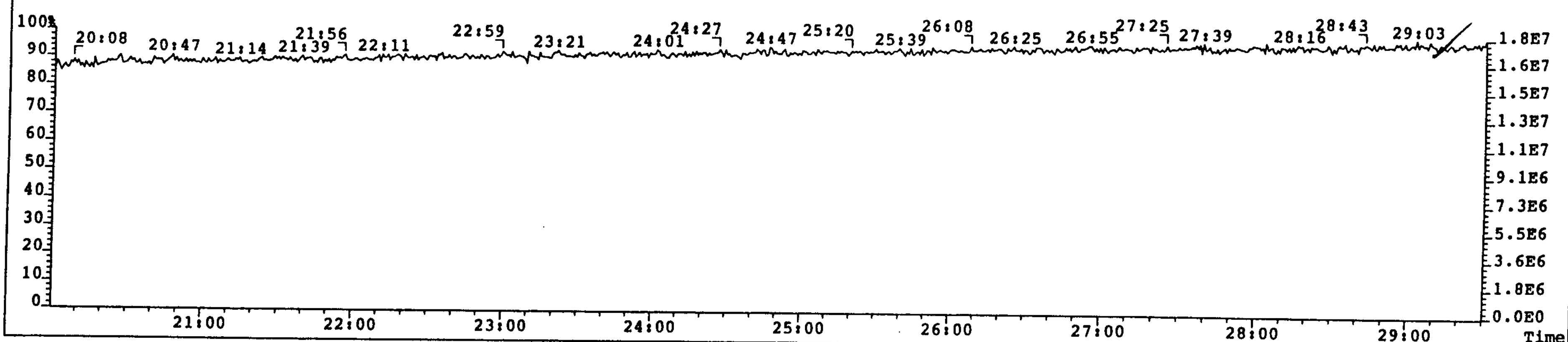
File: 010223P1  Acq: 23-FEB-2001 13:52:50  GC EI+ Voltage SIR  Autospec-UltimaE
Sample# 4  Text: DB5 CPSM / M23 CS3  Vial# 3  File Text: AAP DB5
339.8597 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 63

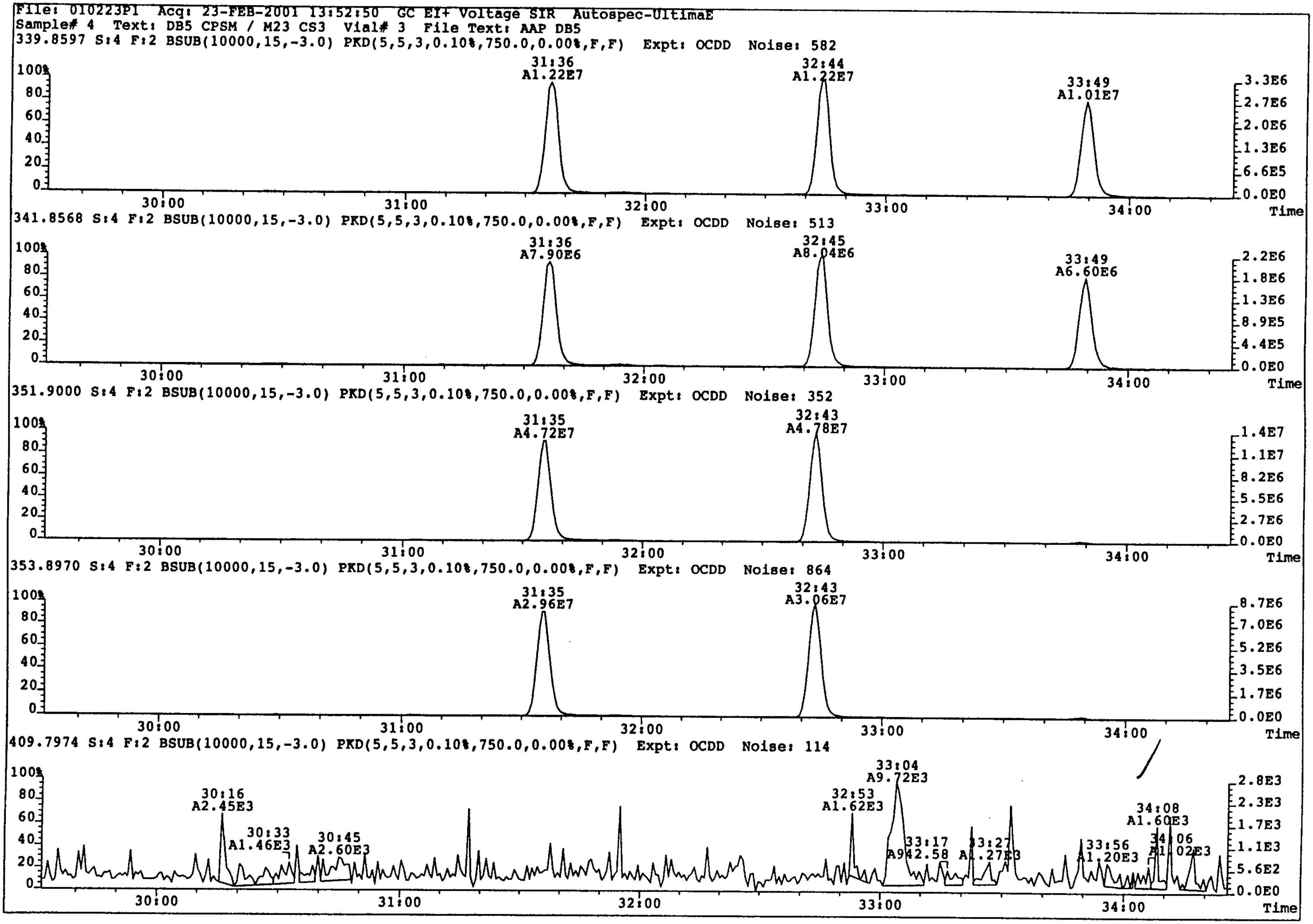



341.8568 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F)  Expt: OCDD  Noise: 84

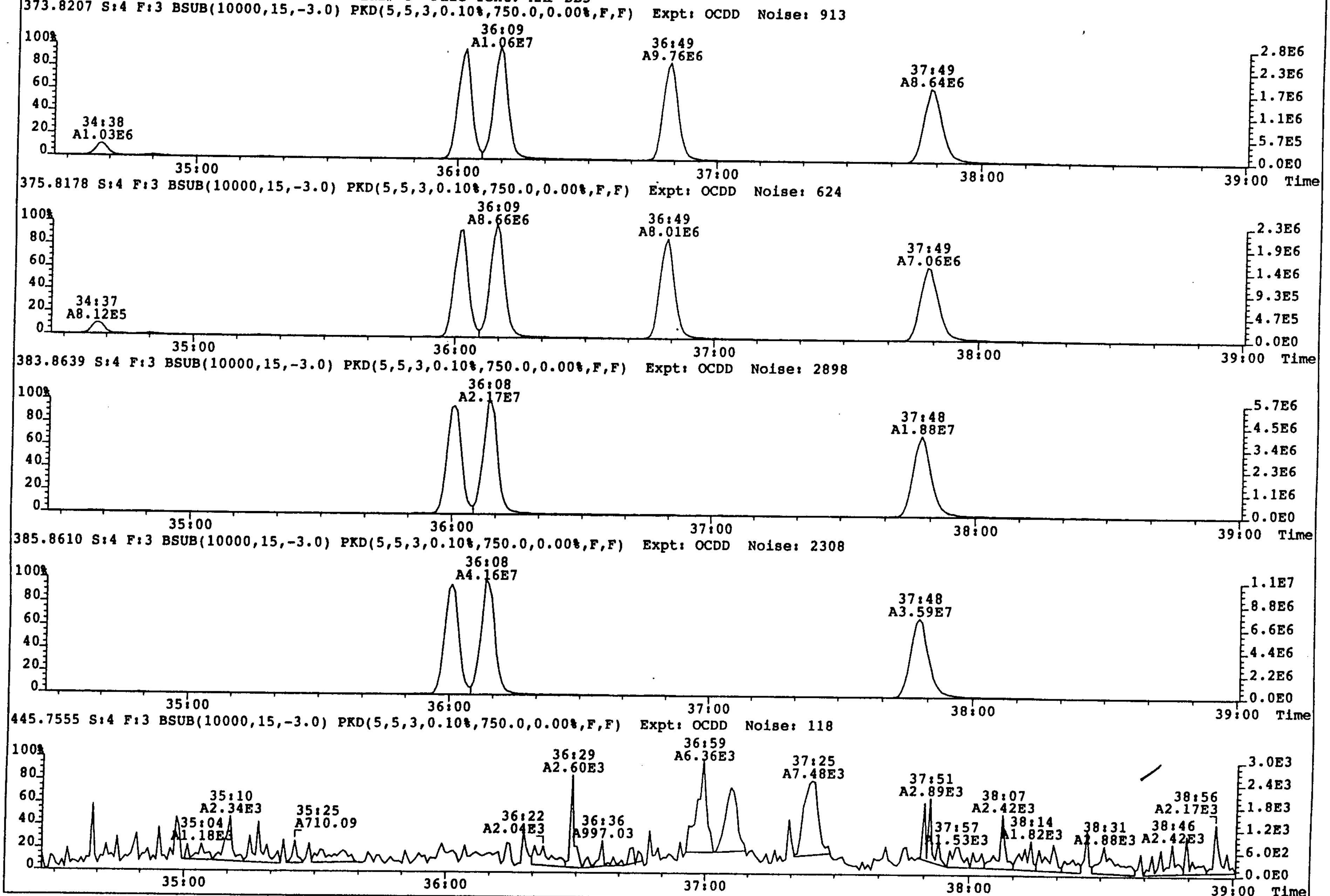



316.9824 S:4  Expt: OCDD

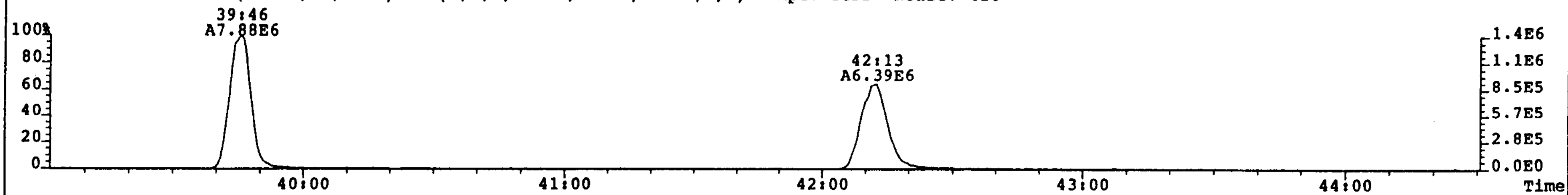



File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 582
31:36
A1.22E7
32:44
A1.22E7
33:49
A1.01E7
100%
80
60
40
20
0
3.3E6
2.7E6
2.0E6
1.3E6
6.6E5
0.0E0
30:00
31:00
32:00
33:00
34:00
Time
341.8568 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 513
31:36
A7.90E6
32:45
A8.04E6
33:49
A6.60E6
2.2E6
1.8E6
1.3E6
8.9E5
4.4E5
0.0E0
351.9000 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 352
31:35
A4.72E7
32:43
A4.78E7
1.4E7
1.1E7
8.2E6
5.5E6
2.7E6
0.0E0
353.8970 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 864
31:35
A2.96E7
32:43
A3.06E7
8.7E6
7.0E6
5.2E6
3.5E6
1.7E6
0.0E0
409.7974 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 114
30:16
A2.45E3
30:33
A1.46E3
30:45
A2.60E3
32:53
A1.62E3
33:04
A9.72E3
33:17
A942.58
33:27
A1.27E3
33:56
A1.20E3
34:08
A1.60E3
34:06
A1.02E3
2.8E3
2.3E3
1.7E3
1.1E3
5.6E2
0.0E0

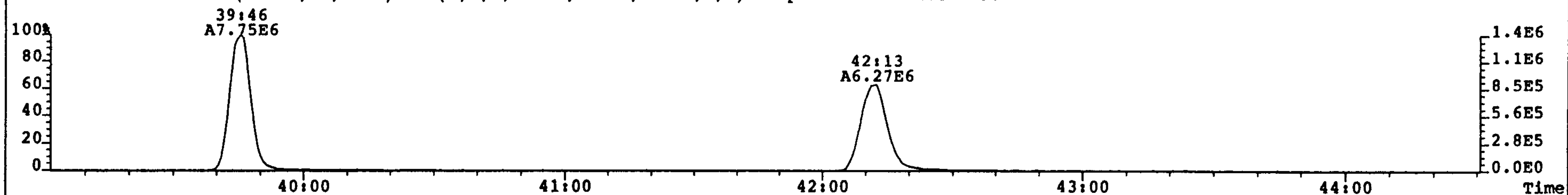
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



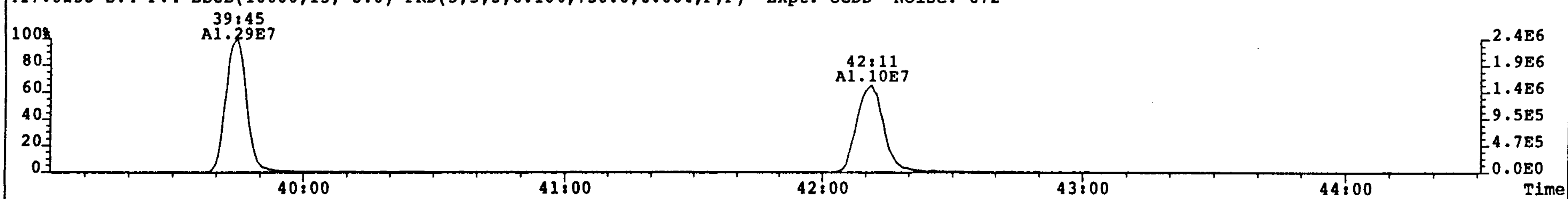
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
407.7818 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 416



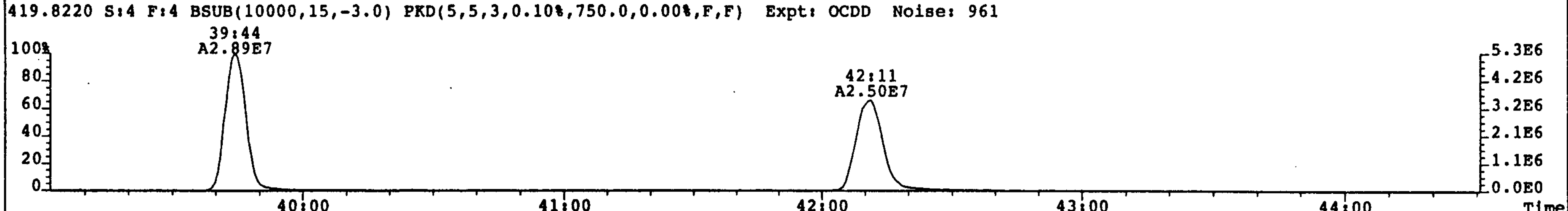

409.7788 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 450



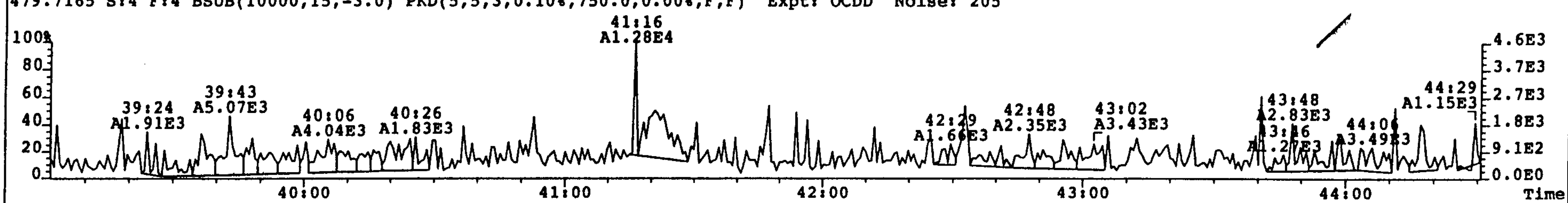

417.8253 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 672



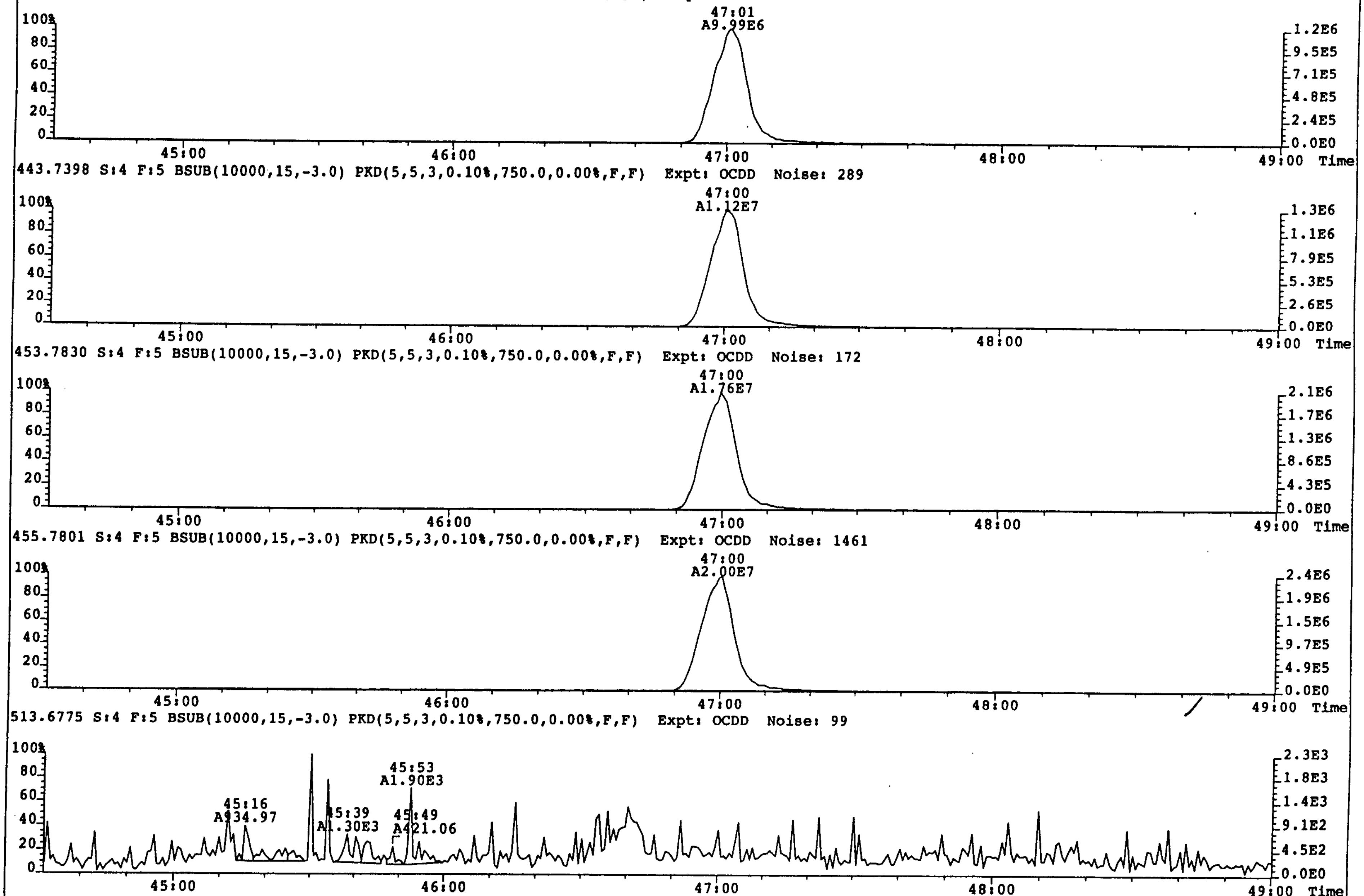

419.8220 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 961




479.7165 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 205



File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
441.7428 S:4 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 138



ALTA ANALYTICAL PERSPECTIVES

# PART 4D

# SYSTEM PERFORMANCE

## "INITIAL CALIBRATION"

DOCUMENTATION FOR THE ANALYSIS
OF
POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS

Initial Calibration RRF Summary (ICAL) Alta Analytical Perspectives



Run: 001005P1 Analyte: m23mm1_cal Cal: mm1_m23_000919 Inst. ID. MM-1

Data filename: 001005P1

| Name | Mean RRF | %RSD | Samp# 3 0.25 RRF#1 | Samp# 4 0.50 RRF#2 | Samp# 5 1.0 RRF#3 | Samp# 6 5.0 RRF#4 | Samp# 7 50 RRF#5 | Samp# 8 100 RRF#6 | Samp# 9 500 RRF#7 |
|---|---|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | 1.26 | 2.04 % | 1.30 | 1.21 | 1.25 | 1.27 | 1.27 | 1.27 | 1.26 |
| 1,2,3,7,8-PeCDD | 1.01 | 5.08 % | 0.98 | 0.93 | 0.99 | 1.06 | 1.06 | 1.01 | 1.06 |
| 1,2,3,4,7,8-HxCDD | 1.14 | 5.15 % | 1.08 | 1.08 | 1.12 | 1.19 | 1.21 | 1.10 | 1.20 |
| 1,2,3,6,7,8-HxCDD | 1.02 | 4.04 % | 1.04 | 0.97 | 1.03 | 1.07 | 1.07 | 0.97 | 1.01 |
| 1,2,3,7,8,9-HxCDD | 1.14 | 4.26 % | 1.11 | 1.10 | 1.12 | 1.21 | 1.20 | 1.09 | 1.16 |
| 1,2,3,4,6,7,8-HpCDD | 1.13 | 5.87 % | 1.10 | 1.05 | 1.07 | 1.17 | 1.19 | 1.10 | 1.22 |
| OCDD | 1.03 | 5.02 % | 1.00 | 0.95 | 0.99 | 1.08 | 1.08 | 1.08 | 1.01 |
| 2,3,7,8-TCDF | 1.05 | 7.26 % | 1.01 | 0.97 | 0.98 | 1.04 | 1.06 | 1.19 | 1.08 |
| 1,2,3,7,8-PeCDF | 1.04 | 4.06 % | 1.02 | 0.98 | 1.01 | 1.09 | 1.09 | 1.01 | 1.06 |
| 2,3,4,7,8-PeCDF | 1.05 | 4.68 % | 1.01 | 1.01 | 1.03 | 1.12 | 1.12 | 1.02 | 1.08 |
| 1,2,3,4,7,8-HxCDF | 1.13 | 5.67 % | 1.11 | 1.05 | 1.13 | 1.20 | 1.20 | 1.05 | 1.17 |
| 1,2,3,6,7,8-HxCDF | 1.24 | 4.10 % | 1.21 | 1.20 | 1.23 | 1.29 | 1.29 | 1.16 | 1.28 |
| 2,3,4,6,7,8-HxCDF | 1.16 | 5.47 % | 1.16 | 1.11 | 1.15 | 1.24 | 1.25 | 1.08 | 1.17 |
| 1,2,3,7,8,9-HxCDF | 1.02 | 5.76 % | 0.97 | 0.97 | 1.01 | 1.09 | 1.10 | 0.96 | 1.04 |
| 1,2,3,4,6,7,8-HpCDF | 1.54 | 4.77 % | 1.49 | 1.45 | 1.51 | 1.63 | 1.63 | 1.50 | 1.58 |
| 1,2,3,4,7,8,9-HpCDF | 1.30 | 6.39 % | 1.24 | 1.19 | 1.27 | 1.39 | 1.39 | 1.23 | 1.38 |
| OCDF | 1.15 | 4.37 % | 1.15 | 1.05 | 1.13 | 1.19 | 1.19 | 1.19 | 1.14 |
| 13C-2,3,7,8-TCDD | 1.13 | 3.53 % | 1.12 | 1.13 | 1.12 | 1.07 | 1.19 | 1.18 | 1.13 |
| 13C-1,2,3,7,8-PeCDD | 0.93 | 6.05 % | 0.90 | 0.90 | 0.88 | 0.86 | 0.96 | 0.99 | 1.00 |
| 13C-1,2,3,6,7,8-HxCDD | 0.93 | 2.49 % | 0.95 | 0.94 | 0.93 | 0.89 | 0.95 | 0.95 | 0.92 |
| 13C-1,2,3,4,6,7,8-HpCDD | 0.91 | 4.58 % | 0.96 | 0.88 | 0.94 | 0.86 | 0.93 | 0.91 | 0.85 |
| 13C-OCDD | 0.73 | 4.88 % | 0.77 | 0.71 | 0.75 | 0.68 | 0.74 | 0.71 | 0.77 |
| 13C-2,3,7,8-TCDF | 1.06 | 3.69 % | 1.05 | 1.11 | 1.04 | 1.01 | 1.08 | 1.11 | 1.03 |
| 13C-1,2,3,7,8-PeCDF | 0.96 | 6.91 % | 0.90 | 0.97 | 0.89 | 0.91 | 0.96 | 1.08 | 1.00 |
| 13C-1,2,3,6,7,8-HxCDF | 1.28 | 3.33 % | 1.31 | 1.31 | 1.28 | 1.21 | 1.30 | 1.33 | 1.24 |
| 13C-1,2,3,4,6,7,8-HpCDF | 0.90 | 4.81 % | 0.96 | 0.90 | 0.94 | 0.85 | 0.92 | 0.90 | 0.85 |
| 13C-OCDF | 0.81 | 4.90 % | 0.84 | 0.78 | 0.83 | 0.74 | 0.83 | 0.81 | 0.85 |
| 13C-1,2,3,4-TCDD | 1.00 | 0.00 % | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 13C-1,2,3,4-TCDF | 1.00 | 0.00 % | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 13C-1,2,3,7,8,9-HxCDD | 1.00 | 0.00 % | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 37Cl-2,3,7,8-TCDD | 0.51 | 1.94 % | 0.50 | 0.51 | 0.51 | 0.52 | 0.50 | 0.52 | 0.53 |
| 13C-2,3,4,7,8-PeCDF | 0.97 | 2.54 % | 0.96 | 0.98 | 0.99 | 1.01 | 0.99 | 0.96 | 0.93 |
| 13C-1,2,3,4,7,8-HxCDD | 0.92 | 1.53 % | 0.90 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.90 |
| 13C-1,2,3,4,7,8-HxCDF | 0.91 | 2.76 % | 0.92 | 0.91 | 0.92 | 0.94 | 0.92 | 0.88 | 0.87 |
| 13C-1,2,3,4,7,8,9-HpCDF | 0.85 | 2.09 % | 0.85 | 0.83 | 0.85 | 0.89 | 0.86 | 0.86 | 0.85 |
| 13C-1,2,3,7,8,9-HxCDF | 1.07 | 3.11 % | 1.08 | 1.08 | 1.09 | 1.06 | 1.10 | 1.06 | 1.00 |

METHODS 23 / TO9A

ICAL

919 STANDARDS

05 OCT 2000.

OK

23OCT00

ALTA ANALYTICAL PERSPECTIVES

# PART 4E

# SYSTEM PERFORMANCE

## "ON-GOING PRECISION & ACCURACY"

DOCUMENTATION FOR THE ANALYSIS
OF
POLYCHLORINATED DIBENZO-*p*-DIOXINS & DIBENZOFURANS

EPA METHOD 23 / TO9A / 428

PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

Alta Analytical Perspectives

Reviewer: ce

Matrix (MM5/PUF): OPR Data Filename: 010214P1-2

Ext. Date: Shift: Analysis Date: 14-FEB-01 Time: 11:57:29

Date: 24 Feb 01

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT.

#275_OPR_23.TIF

| | SPIKE CONC. (ng/mL) | CONC. FOUND (ng/mL) | OPR CONC. LIMITS (ng/mL) |
|---|---|---|---|
| NATIVE ANALYTES | | | |
| 2,3,7,8-TCDD | 5.0 | 4.94 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDD | 25 | 24.9 | 18.8 - 31.2 |
| 1,2,3,4,7,8-HxCDD | 25 | 25.4 | 18.8 - 31.2 |
| 1,2,3,6,7,8-HxCDD | 25 | 24.5 | 18.8 - 31.2 |
| 1,2,3,7,8,9-HxCDD | 25 | 24.3 | 18.8 - 31.2 |
| 1,2,3,4,6,7,8-HpCDD | 25 | 23.0 | 18.8 - 31.2 |
| OCDD | 50 | 47.9 | 37.5 - 62.5 |
| 2,3,7,8-TCDF | 5.0 | 4.23 | 3.75 - 6.25 |
| 1,2,3,7,8-PeCDF | 25 | 22.2 | 18.8 - 31.2 |
| 2,3,4,7,8-PeCDF | 25 | 22.2 | 18.8 - 31.2 |
| 1,2,3,4,7,8-HxCDF | 25 | 22.5 | 18.8 - 31.2 |
| 1,2,3,6,7,8-HxCDF | 25 | 23.9 | 18.8 - 31.2 |
| 2,3,4,6,7,8-HxCDF | 25 | 23.1 | 18.8 - 31.2 |
| 1,2,3,7,8,9-HxCDF | 25 | 23.1 | 18.8 - 31.2 |
| 1,2,3,4,6,7,8-HpCDF | 25 | 22.3 | 18.8 - 31.2 |
| 1,2,3,4,7,8,9-HpCDF | 25 | 20.9 | 18.8 - 31.2 |
| OCDF | 50 | 44.4 | 37.5 - 62.5 |

Analyst: GAG

Date: 23 Feb 01

EPA METHOD 23 / TO9A / 428

PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

Alta Analytical Perspectives

Reviewer: G

Matrix (MM5/PUF):    OPR Data Filename: 010214P1-2

Ext. Date:    Shift:    Analysis Date: 14-FEB-01    Time: 11:57:29

Date: 24 Feb 01

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT.

| LABELED COMPOUNDS | SPIKE CONC. (ng/mL) | CONC. FOUND (ng/mL) | OPR CONC. LIMITS (ng/mL) |
|---|---|---|---|
| 13C-2,3,7,8-TCDD | 200 | 201 ✓ | 80.0 - 260 |
| 13C-1,2,3,7,8-PeCDD | 200 | 214 ✓ | 80.0 - 260 |
| 13C-1,2,3,6,7,8-HxCDD | 200 | 198 ✓ | 80.0 - 260 |
| 13C-1,2,3,4,6,7,8-HpCDD | 200 | 199 ✓ | 80.0 - 260 |
| 13C-OCDD | 200 | 183 ✓ | 80.0 - 260 |
| 13C-2,3,7,8-TCDF | 200 | 196 ✓ | 80.0 - 260 |
| 13C-1,2,3,7,8-PeCDF | 200 | 202 ✓ | 80.0 - 260 |
| 13C-1,2,3,6,7,8-HxCDF | 200 | 179 ✓ | 80.0 - 260 |
| 13C-1,2,3,4,6,7,8-HpCDF | 200 | 180 ✓ | 80.0 - 260 |
| 13C-OCDF | 200 | 178 ✓ | 80.0 - 260 |

Analyst: GAG

Date: 24 Feb 01

Client ID: 0_275_OPR001 Filename: 010214P1 S: 2 Acq: 14-FEB-01 11:57:29 ConCal: 010214P1- 
Lab ID: 0_275_OPR001 GC Column ID: db-5 ICal: MM1_M23_0» wt/vol: 1.000 EndCal: 010214P1-

| | Name | Resp | RA | RRF | RT | Conc | Qualif. | CDE | noise | Fac | DL | EMPC / Rec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2,3,7,8-TCDD | 2.09e+06 | 0.80 y | 1.26 | 27:44 | 4.94 | | | 908 | 2.5 | 0.0392 | |
| | 1,2,3,7,8-PeCDD | 7.32e+06 | 1.56 y | 1.01 | 33:12 | 24.9 | | | 566 | 2.5 | 0.0451 | |
| | 1,2,3,4,7,8-HxCDD | 6.80e+06 | 1.26 y | 1.14 | 37:06 | 25.4 | | | 2774 | 2.5 | 0.222 | |
| | 1,2,3,6,7,8-HxCDD | 5.90e+06 | 1.26 y | 1.02 | 37:13 | 24.5 | | | 2774 | 2.5 | 0.247 | |
| | 1,2,3,7,8,9-HxCDD | 6.53e+06 | 1.26 y | 1.14 | 37:32 | 24.3 | | | 2774 | 2.5 | 0.221 | |
| | 1,2,3,4,6,7,8-HpCDD | 5.96e+06 | 1.00 y | 1.13 | 41:31 | 23.0 | | | 2433 | 2.5 | 0.270 | |
| | OCDD | 8.43e+06 | 0.87 y | 1.03 | 46:51 | 47.9 | | | 898 | 2.5 | 0.179 | |
| | 2,3,7,8-TCDF | 1.85e+06 | 0.75 y | 1.05 | 26:51 | 4.23 | | | 1519 | 2.5 | 0.0642 | |
| | 1,2,3,7,8-PeCDF | 8.96e+06 | 1.54 y | 1.04 | 31:43 | 22.2 | | | 1090 | 2.5 | 0.0615 | |
| | 2,3,4,7,8-PeCDF | 9.10e+06 | 1.54 y | 1.05 | 32:51 | 22.2 | | | 1090 | 2.5 | 0.0605 | |
| | 1,2,3,4,7,8-HxCDF | 7.46e+06 | 1.22 y | 1.13 | 36:07 | 22.5 | | | 2199 | 2.5 | 0.0882 | |
| | 1,2,3,6,7,8-HxCDF | 8.67e+06 | 1.23 y | 1.24 | 36:16 | 23.9 | | | 2199 | 2.5 | 0.0806 | |
| | 2,3,4,6,7,8-HxCDF | 7.88e+06 | 1.22 y | 1.16 | 36:55 | 23.1 | | | 2199 | 2.5 | 0.0857 | |
| | 1,2,3,7,8,9-HxCDF | 6.89e+06 | 1.20 y | 1.02 | 37:56 | 23.1 | | | 2199 | 2.5 | 0.0980 | |
| | 1,2,3,4,6,7,8-HpCDF | 7.10e+06 | 1.03 y | 1.54 | 39:53 | 22.3 | | | 1801 | 2.5 | 0.101 | |
| | 1,2,3,4,7,8,9-HpCDF | 5.63e+06 | 1.02 y | 1.30 | 42:20 | 20.9 | | | 1801 | 2.5 | 0.120 | |
| | OCDF | 9.38e+06 | 0.89 y | 1.15 | 47:10 | 44.4 | | | 2019 | 2.5 | 0.308 | EMPC |
| | Total Tetra-Dioxins | 2.09e+06 | 0.87 y | 1.26 | 21:51 | 4.95 | | | 908 | 2.5 | 0.0392 | 5.00 |
| | Total Penta-Dioxins | 7.32e+06 | 1.56 y | 1.01 | 33:12 | 24.9 | | | 566 | 2.5 | 0.0451 | 25.1 |
| | Total Hexa-Dioxins | 1.92e+07 | 1.26 y | 1.10 | 37:06 | 74.1 | | | 2774 | 2.5 | 0.229 | 74.4 |
| | Total Hepta-Dioxins | 6.09e+06 | 0.90 y | 1.13 | 40:20 | 23.5 | | | 2433 | 2.5 | 0.270 | 23.9 |
| | Total Tetra-Furans | 1.89e+06 | 0.78 y | 1.05 | 25:28 | 4.32 | | | 1519 | 2.5 | 0.0642 | 4.59 |
| | 1st Fnc. Penta-Furans | * | * n | 1.05 | NotF» | * | | | 1802 | 2.5 | 0.101 | 0.213 |
| | Total Penta-Furans | 1.84e+07 | 1.70 y | 1.05 | 30:35 | 45.3 | | | 1090 | 2.5 | 0.0610 | |
| | PeCDF Totals: | | | | | 45.3 | | | | | | 45.9 |
| | Total Hexa-Furans | 3.09e+07 | 1.22 y | 1.14 | 36:07 | 92.7 | | | 2199 | 2.5 | 0.0876 | 93.2 |
| | Total Hepta-Furans | 1.28e+07 | 1.03 y | 1.42 | 39:53 | 43.3 | | | 1801 | 2.5 | 0.110 | 44.1 |
| | | | | | | | | | | | | Rec |
| IS | 13C-2,3,7,8-TCDD | 6.69e+07 | 0.79 y | 1.13 | 27:43 | 201 | | | | | | 101 |
| IS | 13C-1,2,3,7,8-PeCDD | 5.81e+07 | 1.54 y | 0.93 | 33:10 | 214 | | | | | | 107 |
| IS | 13C-1,2,3,6,7,8-HxCDD | 4.71e+07 | 1.25 y | 0.93 | 37:12 | 198 | | | | | | 99.0 |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.59e+07 | 1.06 y | 0.91 | 41:30 | 199 | | | | | | 99.5 |
| IS | 13C-OCDD | 3.43e+07 | 0.90 y | 0.73 | 46:50 | 183 | | | | | | 91.7 |
| IS | 13C-2,3,7,8-TCDF | 8.34e+07 | 0.78 y | 1.06 | 26:49 | 196 | | | | | | 98.1 |
| IS | 13C-1,2,3,7,8-PeCDF | 7.77e+07 | 1.56 y | 0.96 | 31:42 | 202 | | | | | | 101 |
| IS | 13C-1,2,3,6,7,8-HxCDF | 5.86e+07 | 0.51 y | 1.28 | 36:15 | 179 | | | | | | 89.7 |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 4.14e+07 | 0.44 y | 0.90 | 39:52 | 180 | | | | | | 90.0 |
| IS | 13C-OCDF | 3.68e+07 | 0.88 y | 0.81 | 47:09 | 178 | | | | | | 89.2 |
| RS/RT | 13C-1,2,3,4-TCDD | 5.87e+07 | 0.79 y | 1.00 | 27:03 | 200 | | | | | | |
| RS | 13C-1,2,3,4-TCDF | 8.02e+07 | 0.77 y | 1.00 | 25:27 | 200 | | | | | | |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD | 5.10e+07 | 1.25 y | 1.00 | 37:31 | 200 | | | | | | |
| PS | 37Cl-2,3,7,8-TCDD | 2.31e+04 | | 0.51 | 27:44 | 0.134 | | | | | | 0.0672 |
| PS | 13C-2,3,4,7,8-PeCDF | * | * n | 0.97 | NotF» | * | | | | | | * |
| PS | 13C-1,2,3,4,7,8-HxCDD | * | * n | 0.92 | NotF» | * | | | | | | * |
| PS | 13C-1,2,3,4,7,8-HxCDF | 1.38e+05 | 0.46 y | 0.91 | 36:06 | 0.517 | | | | | | 0.259 |
| PS | 13C-1,2,3,4,7,8,9-HpCDF | 1.35e+05 | 0.44 y | 0.85 | 42:20 | 0.765 | | | | | | 0.383 |
| AS | 13C-1,2,3,7,8,9-HxCDF | 4.96e+07 | 0.51 y | 1.07 | 37:54 | 182 | | | | | | 91.0 |

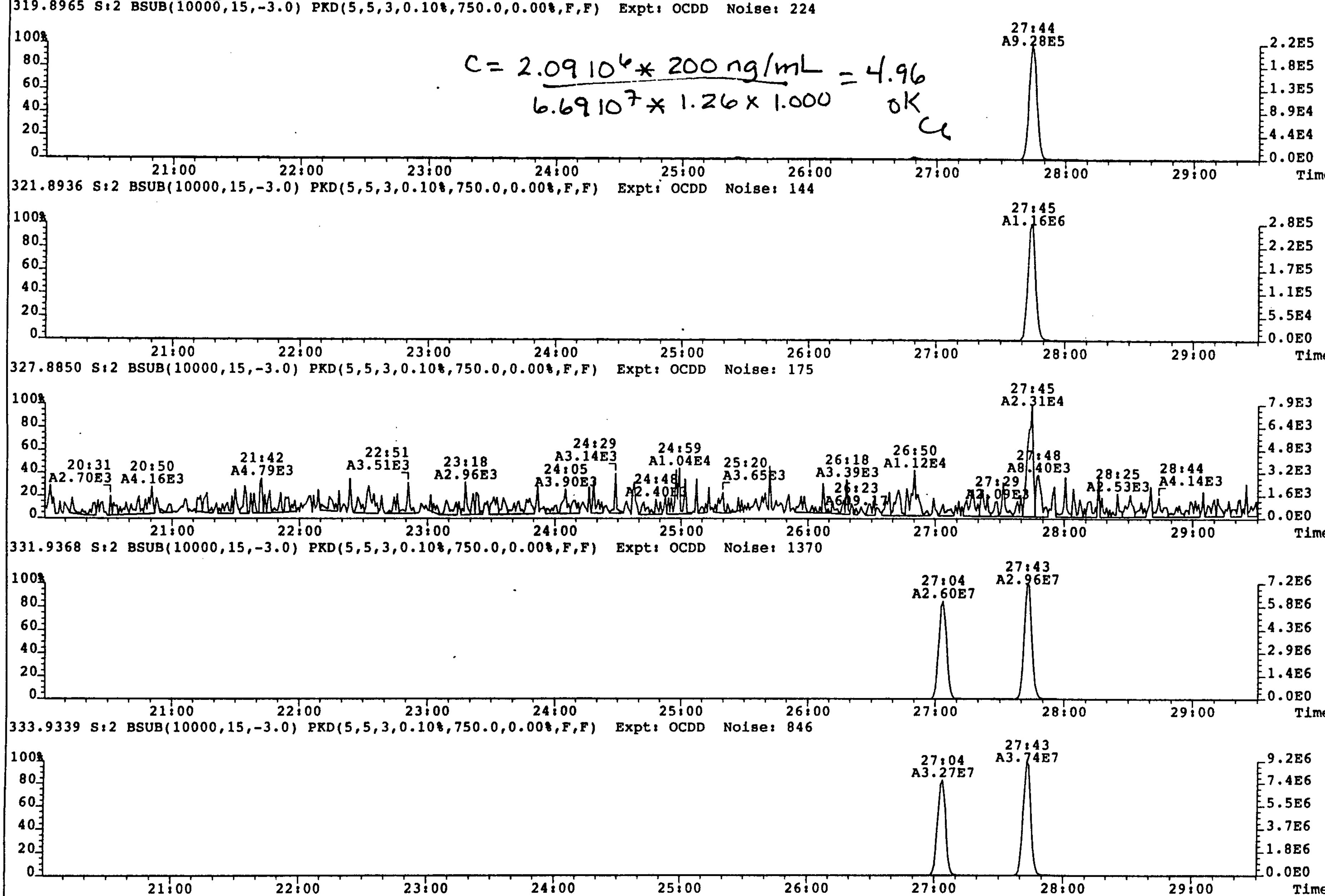
Reviewer: ce
Date: 24Feb01

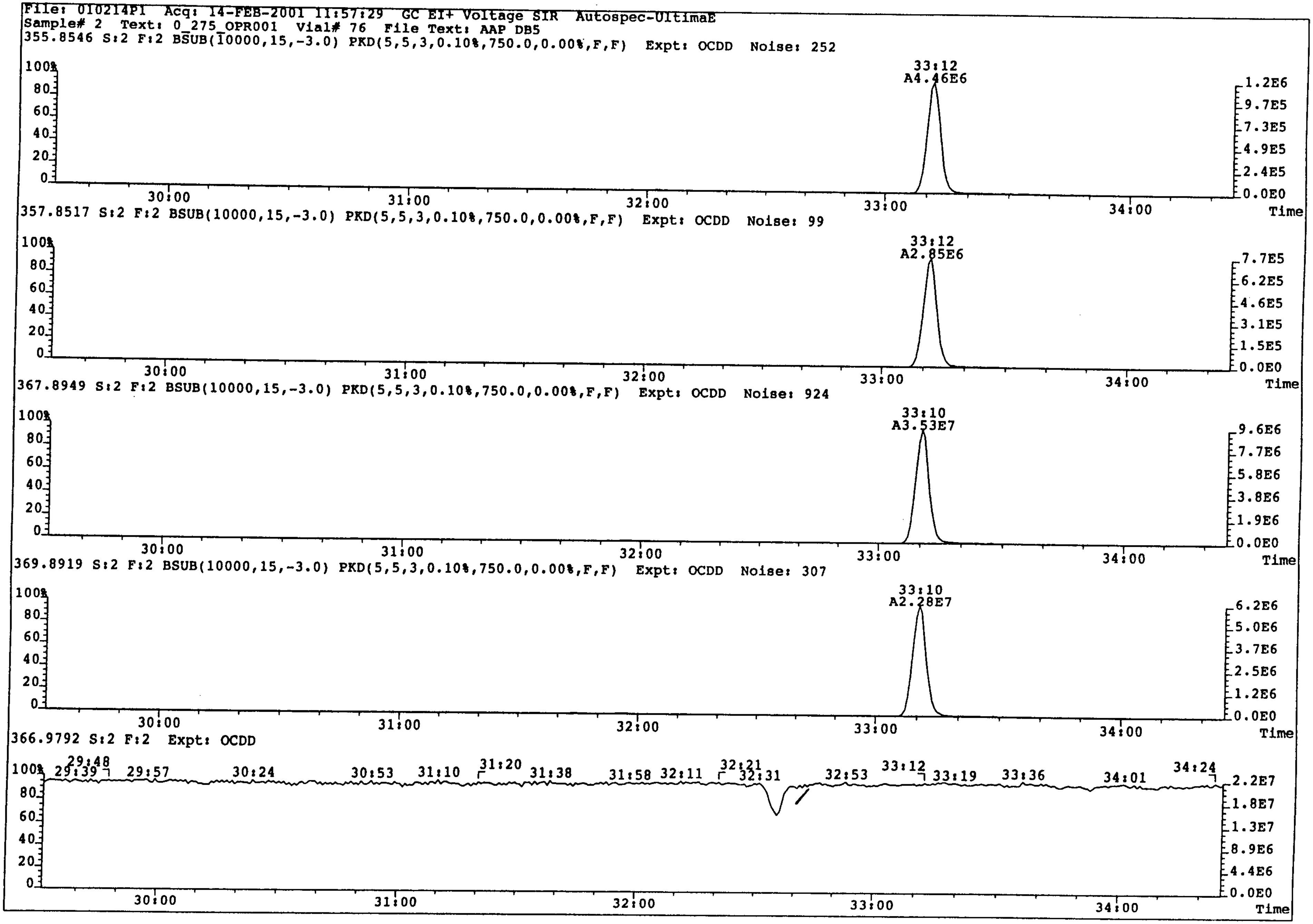
Analyst: GAG
Date: 24Feb01

File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5

$$C = \frac{2.09\,10^6 * 200\ ng/mL}{6.69\,10^7 * 1.26 \times 1.000} = 4.96$$

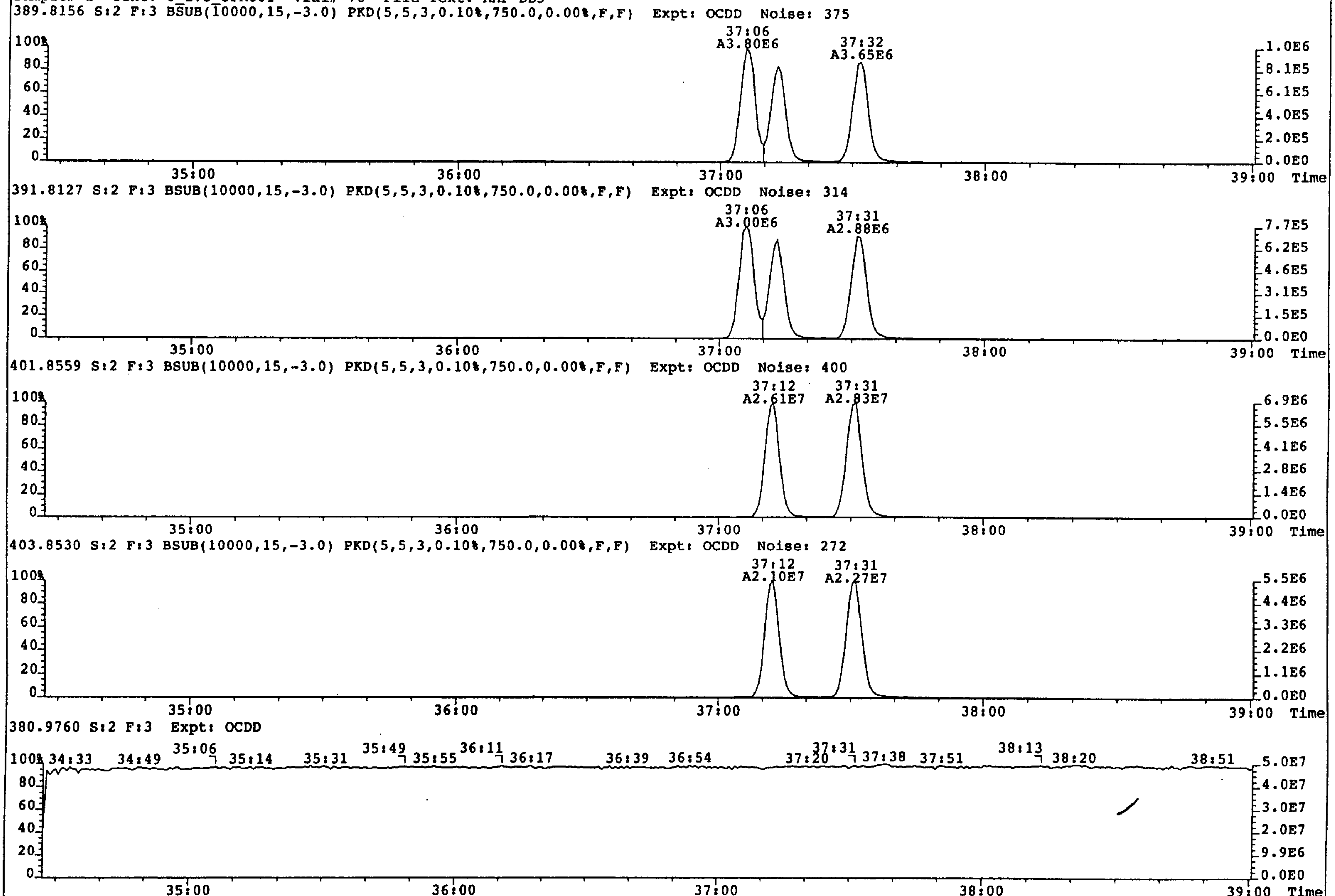
ok



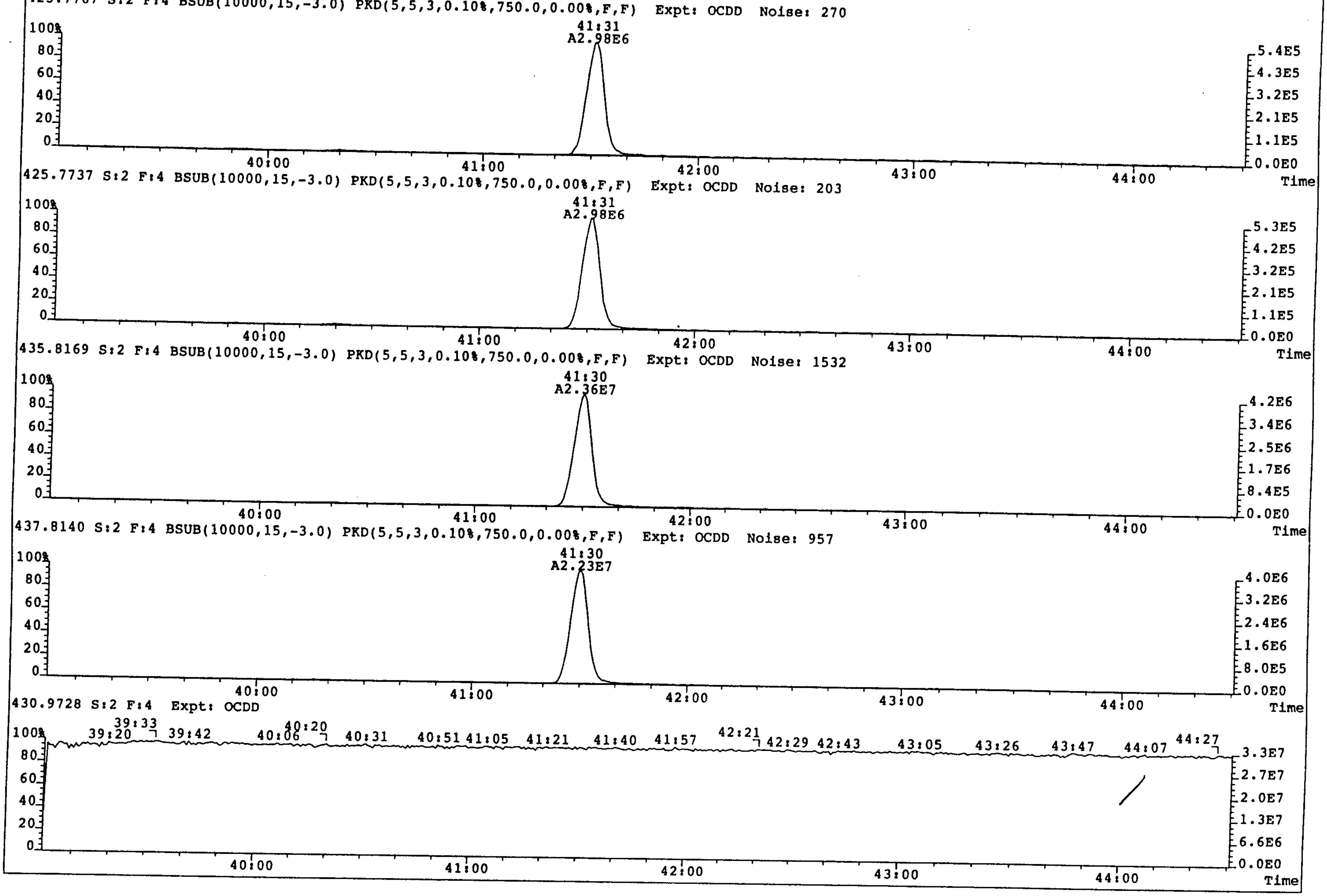


File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
355.8546 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 252
33:12
A4.46E6
1.2E6
9.7E5
7.3E5
4.9E5
2.4E5
0.0E0
357.8517 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 99
33:12
A2.85E6
7.7E5
6.2E5
4.6E5
3.1E5
1.5E5
0.0E0
367.8949 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 924
33:10
A3.53E7
9.6E6
7.7E6
5.8E6
3.8E6
1.9E6
0.0E0
369.8919 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 307
33:10
A2.28E7
6.2E6
5.0E6
3.7E6
2.5E6
1.2E6
0.0E0
366.9792 S:2 F:2 Expt: OCDD
29:39 29:48 29:57 30:24 30:53 31:10 31:20 31:38 31:58 32:11 32:21 32:31 32:53 33:12 33:19 33:36 34:01 34:24
2.2E7
1.8E7
1.3E7
8.9E6
4.4E6
0.0E0
100% 80 60 40 20 0
30:00 31:00 32:00 33:00 34:00
Time

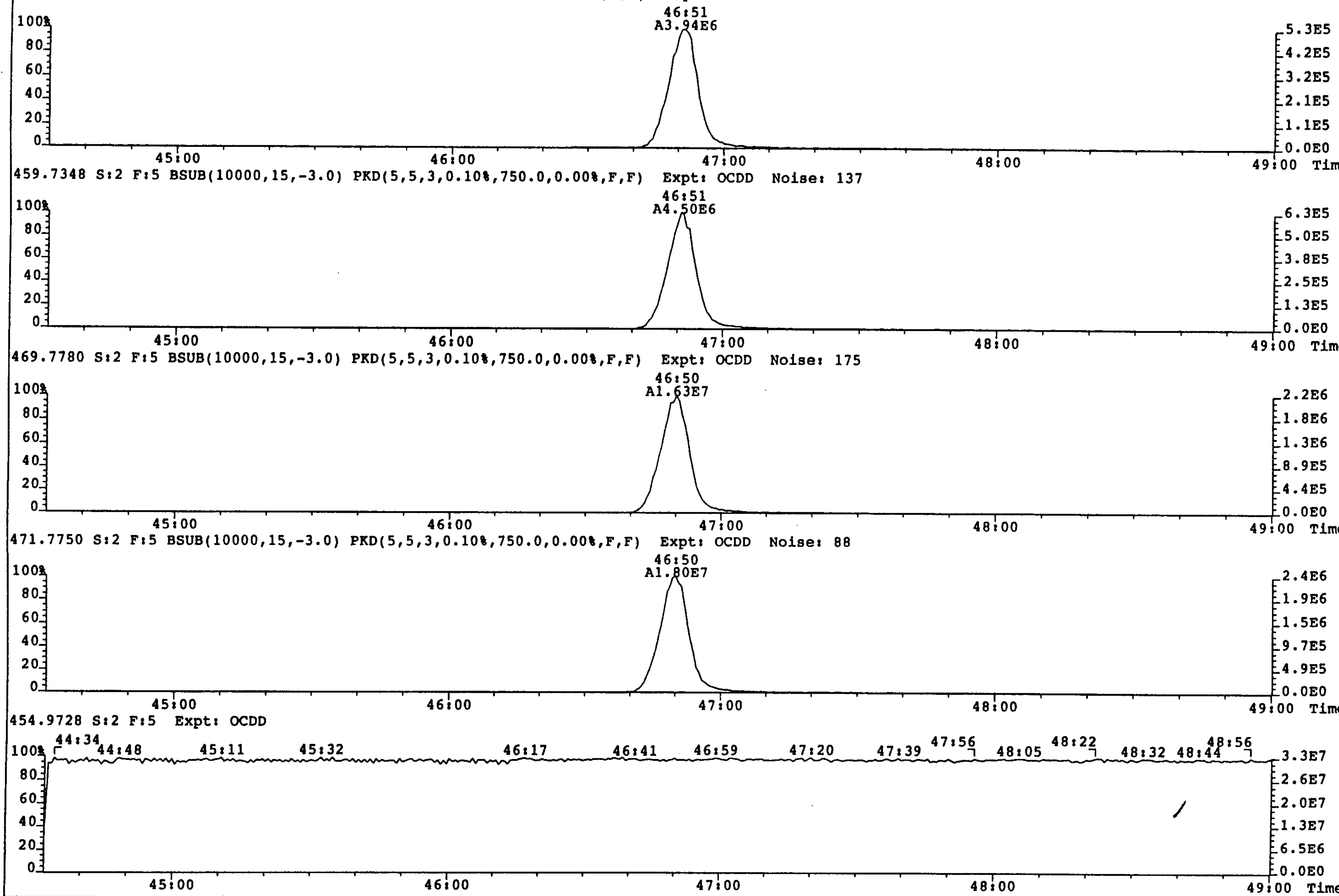
File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5

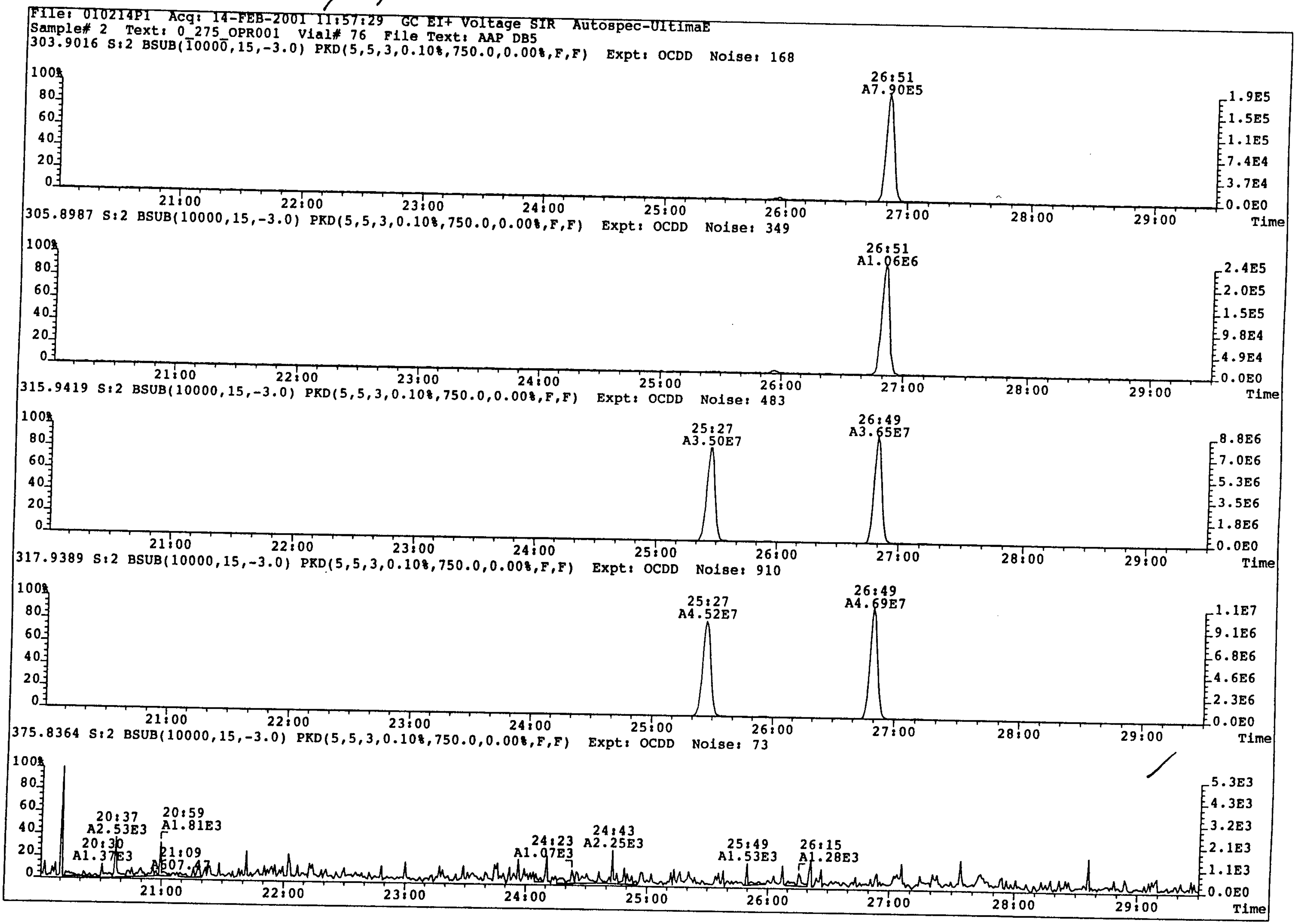


File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5

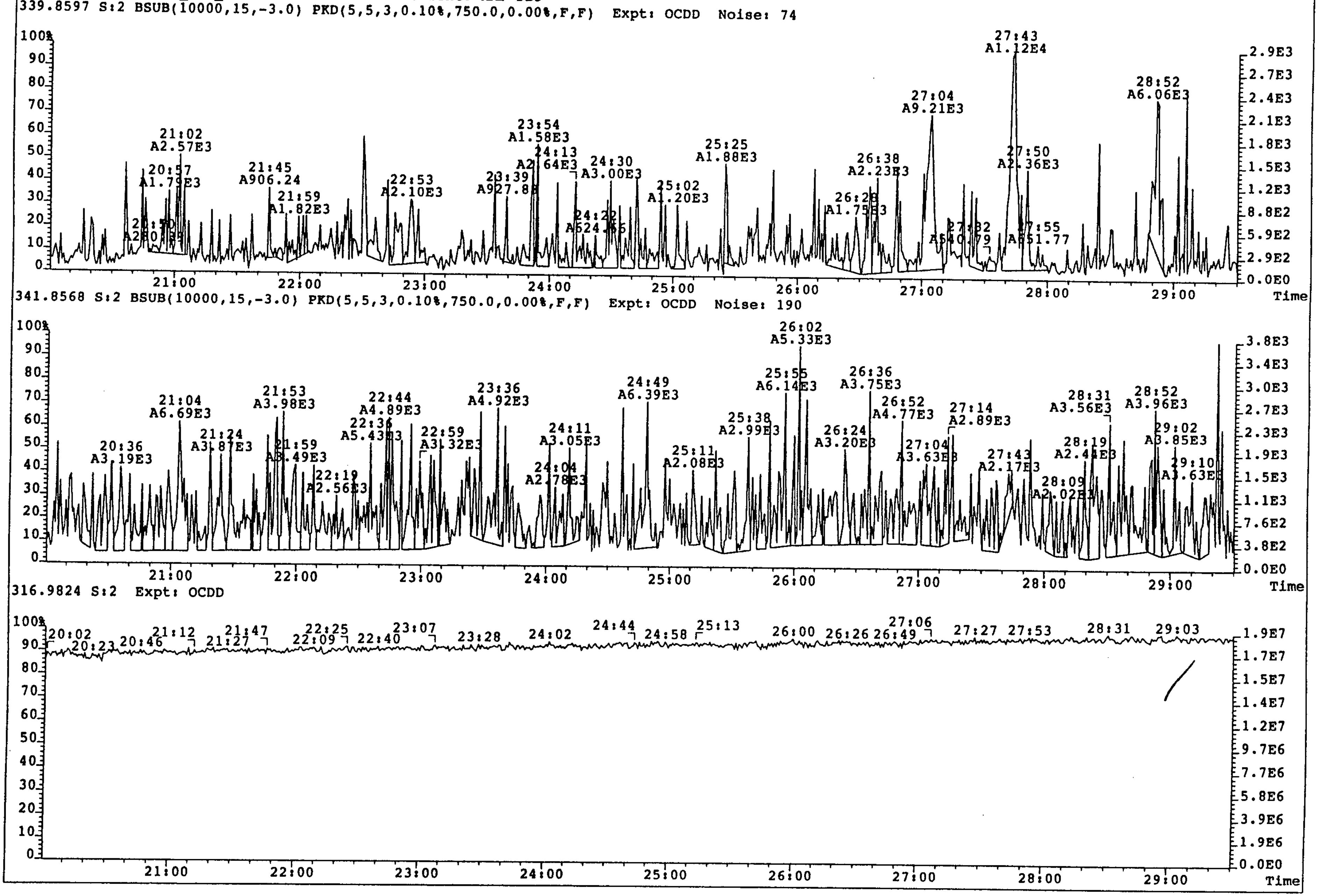


File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
457.7377 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 273

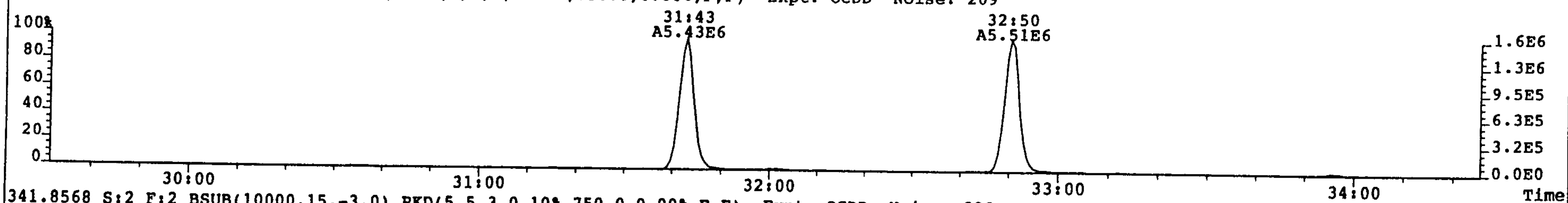



File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
303.9016 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 168
26:51
A7.90E5
1.9E5
1.5E5
1.1E5
7.4E4
3.7E4
0.0E0
305.8987 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 349
26:51
A1.06E6
2.4E5
2.0E5
1.5E5
9.8E4
4.9E4
0.0E0
315.9419 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 483
25:27
A3.50E7
26:49
A3.65E7
8.8E6
7.0E6
5.3E6
3.5E6
1.8E6
0.0E0
317.9389 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 910
25:27
A4.52E7
26:49
A4.69E7
1.1E7
9.1E6
6.8E6
4.6E6
2.3E6
0.0E0
375.8364 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 73
20:37
A2.53E3
20:30
A1.37E3
20:59
A1.81E3
21:09
A607.47
24:23
A1.07E3
24:43
A2.25E3
25:49
A1.53E3
26:15
A1.28E3
5.3E3
4.3E3
3.2E3
2.1E3
1.1E3
0.0E0
100%
80
60
40
20
0
21:00
22:00
23:00
24:00
25:00
26:00
27:00
28:00
29:00
Time

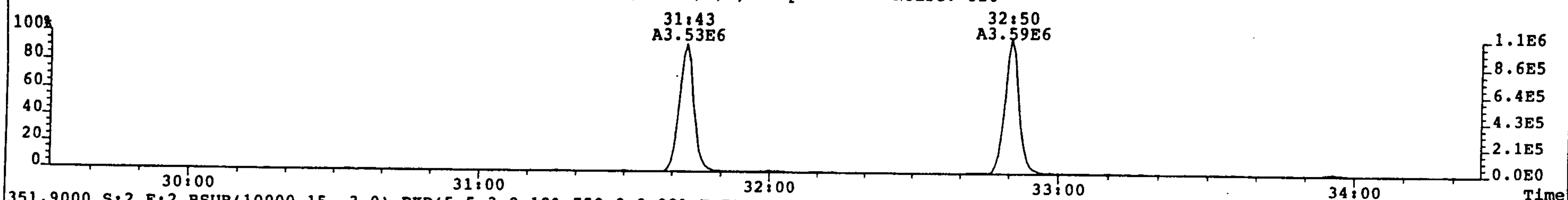
File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5



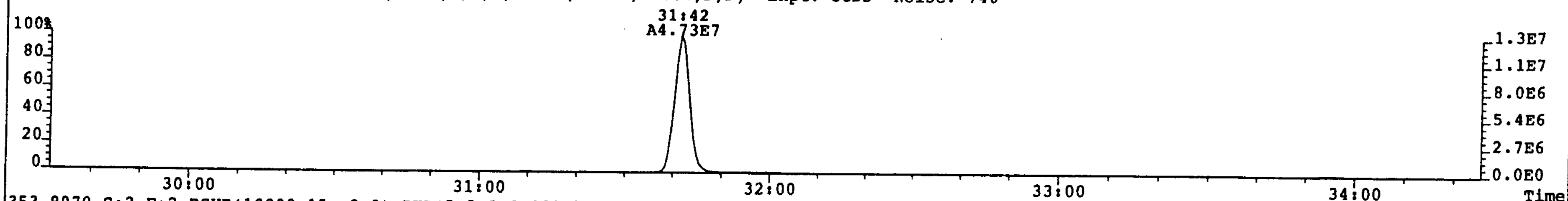
File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
339.8597 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 209



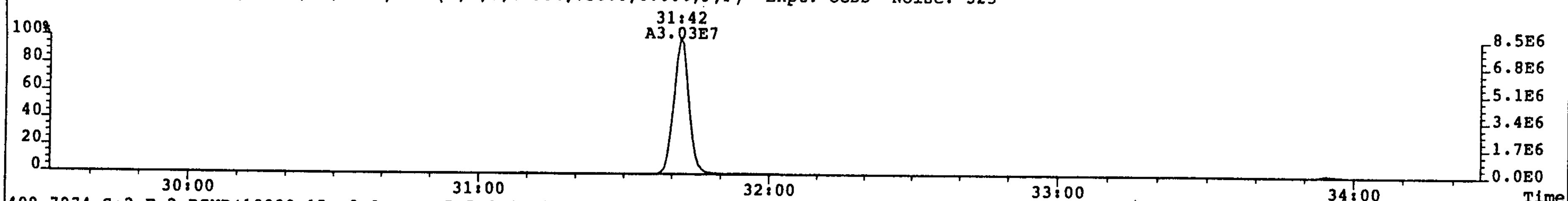

341.8568 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 320



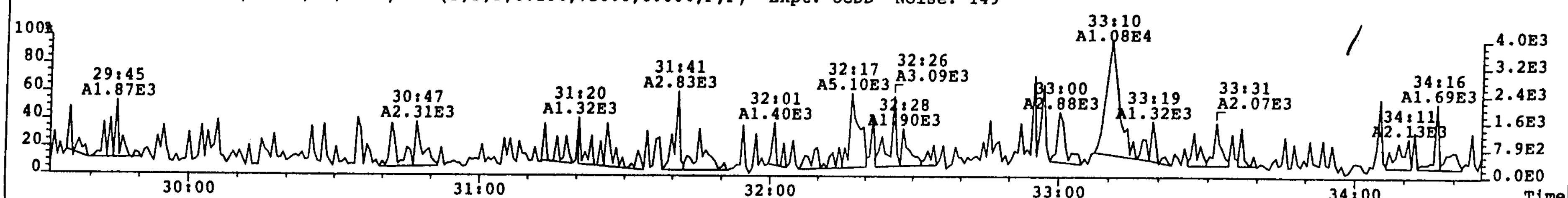

351.9000 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 740



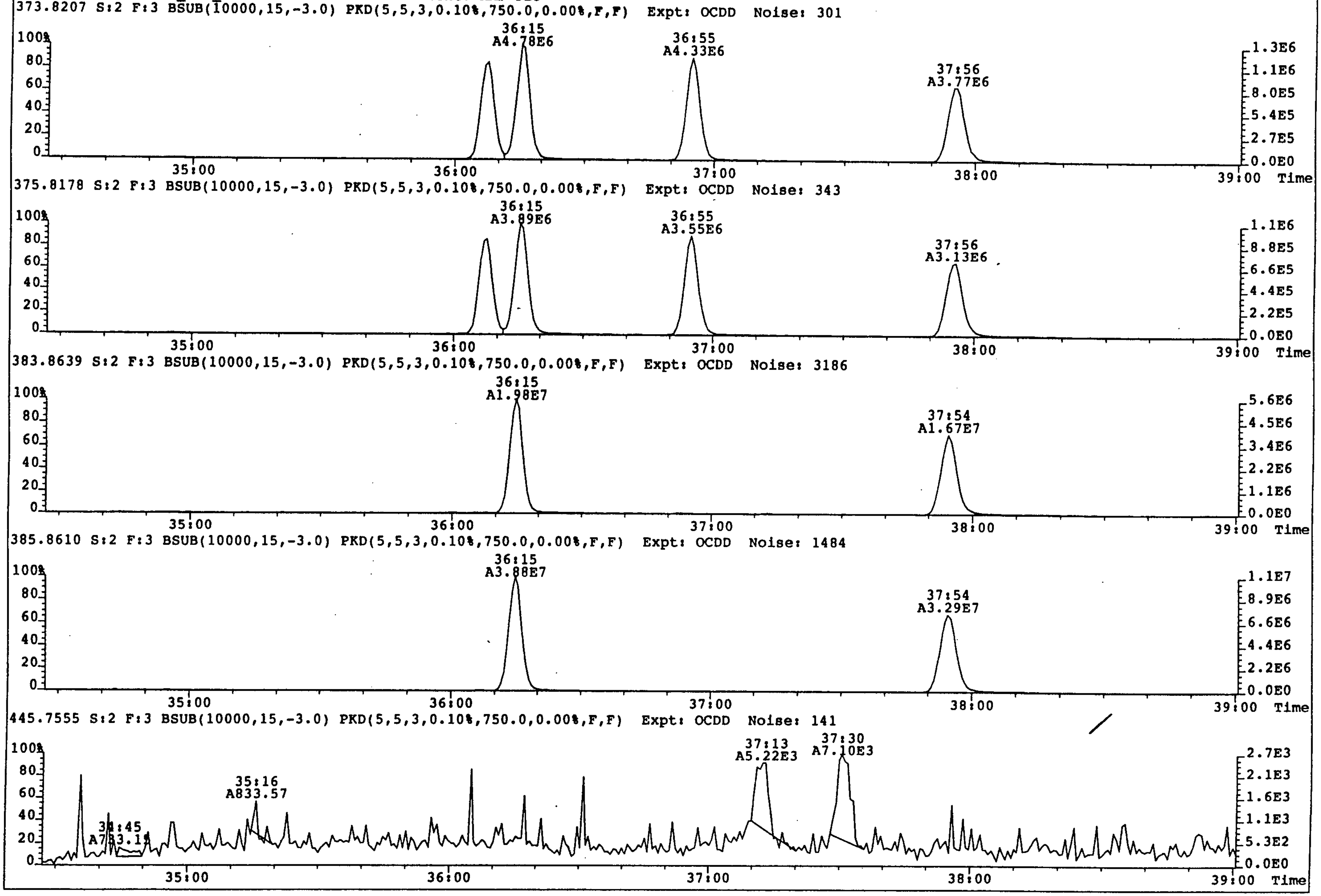

353.8970 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 325



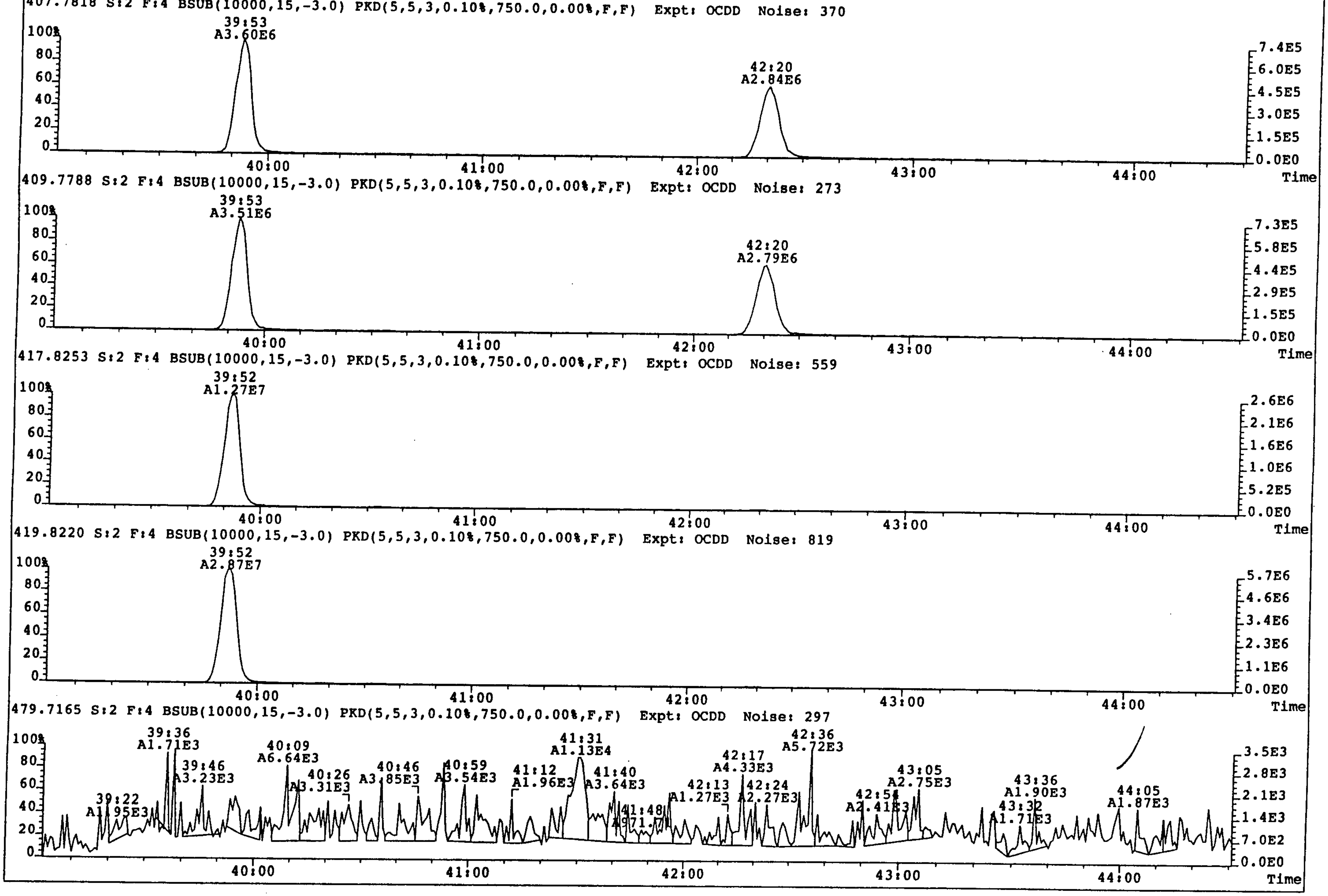

409.7974 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 149



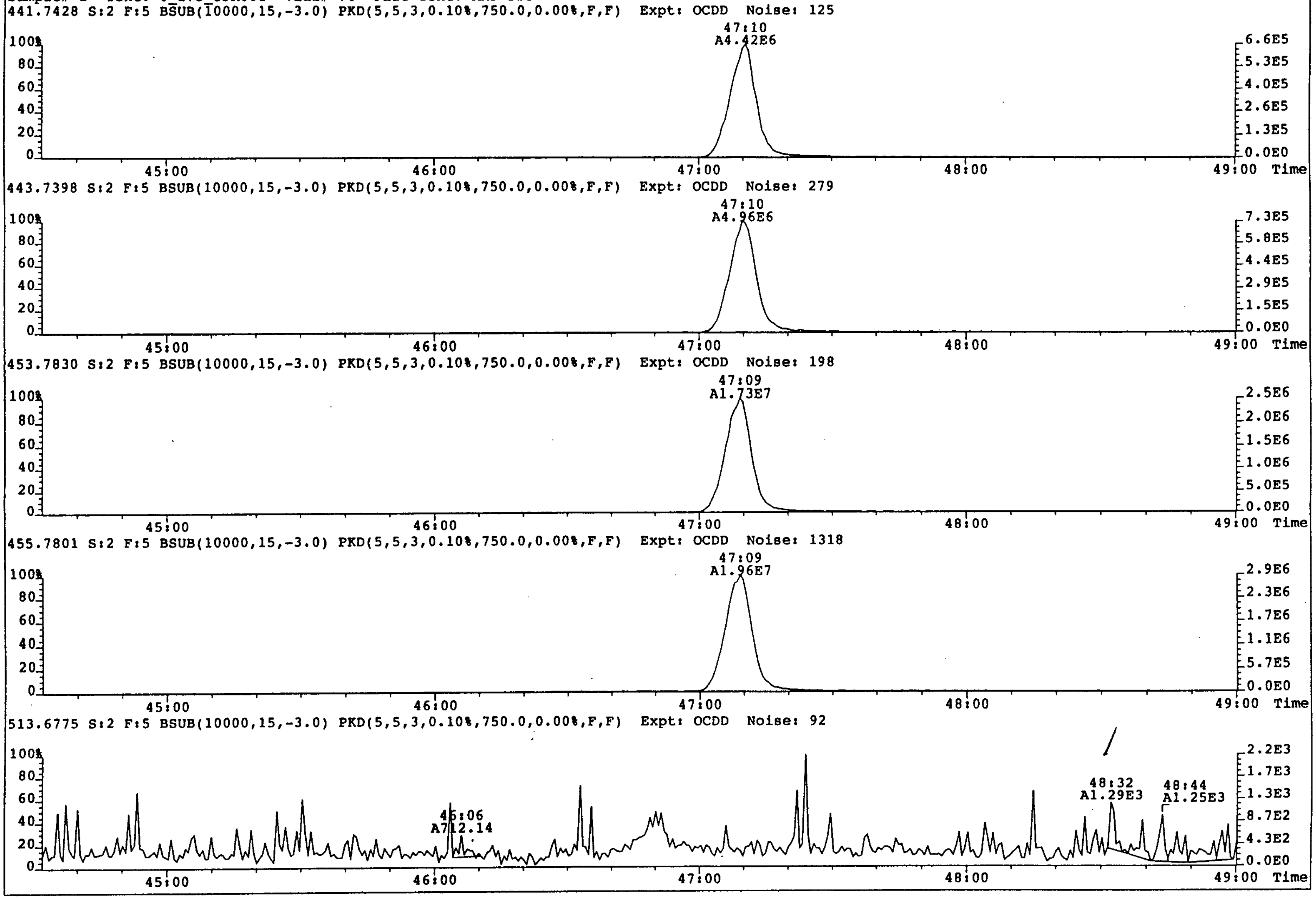
File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5



File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5



File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5



# APPENDIX D
# CALCULATIONS

**Summary of Stack Gas Parameters and Test Results**
**Malcolm Grow Medical Center - Andrews AFB, MD**
**US EPA Test Method 29 - Multiple Metals**
**Page 1 of 2**

| | RUN NUMBER | M29-1 | M29-2 | M29-3 | |
|---|---|---|---|---|---|
| | RUN DATE | 2/2/01 | 2/2/01 | 2/2/01 | Average |
| | RUN TIME | 0945-1050 | 1230-1335 | 1405-1510 | |
| | MEASURED DATA | | | | |
| $\gamma$ | Meter Box Correction Factor | 0.995 | 0.995 | 0.995 | 0.995 |
| $\Delta H$ | Avg Meter Orifice Pressure, in. $H_2$ | 1.71 | 1.69 | 1.74 | 1.71 |
| $P_{bar}$ | Barometric Pressure, inches Hg | 29.90 | 29.90 | 29.90 | 29.90 |
| $V_m$ | Sample Volume, $ft^3$ | 43.850 | 42.030 | 46.450 | 44.110 |
| $T_m$ | Average Meter Temperature, °F | 102 | 103 | 103 | 103 |
| $P_{static}$ | Stack Static Pressure, inches $H_2O$ | 0.15 | 0.2 | 0.15 | 0.15 |
| $T_s$ | Average Stack Temperature, °F | 171 | 172 | 172 | 172 |
| $V_{lc}$ | Condensate Collected, ml | 354.9 | 339.1 | 356.4 | 350.1 |
| $CO_2$ | Carbon Dioxide content, % by volu | 6.3 | 7.2 | 6.0 | 6.5 |
| $O_2$ | Oxygen content, % by volume | 11.6 | 11.9 | 12.3 | 11.9 |
| $N_2$ | Nitrogen content, % by volume | 82.1 | 80.9 | 81.7 | 81.6 |
| $C_p$ | Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 | 0.84 |
| $\Delta p^{1/2}$ | Average Square Root $\Delta p$, (in. $H_2O$) | 0.5844 | 0.5811 | 0.5893 | 0.5849 |
| $\Theta$ | Sample Run Duration, minutes | 60 | 60 | 60 | 60 |
| $D_n$ | Nozzle Diameter, inches | 0.310 | 0.310 | 0.310 | 0.310 |
| | CALCULATED DATA | | | | |
| $A_n$ | Nozzle Area, $ft^2$ | 0.000524 | 0.000524 | 0.000524 | 0.000524 |
| $V_{m(std)}$ | Standard Meter Volume, $ft^3$ | 41.144 | 39.309 | 43.496 | 41.316 |
| $V_{m(std)}$ | Standard Meter Volume, $m^3$ | 1.165 | 1.113 | 1.232 | 1.170 |
| $Q_m$ | Average Sampling Rate, dscfm | 0.686 | 0.655 | 0.725 | 0.689 |
| $P_s$ | Stack Pressure, inches Hg | 29.91 | 29.91 | 29.91 | 29.91 |
| $B_{ws}$ | Moisture, % by volume | 28.9 | 28.9 | 27.8 | 28.5 |
| $B_{ws(sat)}$ | Moisture (at saturation), % by volu | 42.0 | 42.3 | 42.1 | 42.1 |
| $V_{wstd}$ | Standard Water Vapor Volume, $ft^3$ | 16.705 | 15.961 | 16.776 | 16.481 |
| $1-B_{ws}$ | Dry Mole Fraction | 0.711 | 0.711 | 0.722 | 0.715 |
| $M_d$ | Molecular Weight (d.b.), lb/lb•mole | 29.47 | 29.63 | 29.45 | 29.52 |
| $M_s$ | Molecular Weight (w.b.), lb/lb•mole | 26.16 | 26.27 | 26.26 | 26.23 |
| $V_s$ | Stack Gas Velocity, ft/s | 37.7 | 37.4 | 37.9 | 37.7 |
| A | Stack Area, $ft^2$ | 1.289 | 1.289 | 1.289 | 1.289 |
| $Q_a$ | Stack Gas Volumetric flow, acfm | 2,916 | 2,894 | 2,934 | 2,915 |
| $Q_s$ | Stack Gas Volumetric flow, dscfm | 1,733 | 1,719 | 1,769 | 1,740 |
| $Q_s$ | Stack Gas Volumetric flow, dscmm | 49.1 | 48.7 | 50.1 | 49.3 |
| I | Isokinetic Sampling Ratio, % | 97.3 | 93.7 | 100.8 | 97.3 |

**Summary of Stack Gas Parameters and Test Results**
**Malcolm Grow Medical Center - Andrews AFB, MD**
**US EPA Test Method 29 - Multiple Metals**
**Page 2 of 2**

| | | | | | |
|---|---|---|---|---|---|
| | ***RUN NUMBER*** | ***M29-1*** | ***M29-2*** | ***M29-3*** | |
| | ***RUN DATE*** | ***2/2/01*** | ***2/2/01*** | ***2/2/01*** | ***Average*** |
| | ***RUN TIME*** | ***0945-1050*** | ***1230-1335*** | ***1405-1510*** | |
| | EMISSIONS DATA | | | | |
| | <u>Particulate Matter</u> | | | | |
| PM | Target Catch, g | 0.0063 | 0.0750 | 0.0711 | 0.0508 |
| $C_{PM}$ | Concentration, gr/dscf | 0.00236 | 0.0294 | 0.0252 | 0.0190 |
| $C_{PM}$ @ 7% O | Concentration, gr/dscf @ 7% $O_2$ | 0.0035 | 0.0455 | 0.0408 | 0.0299 |
| $C_{PM}$ | Concentration, mg/dscm | 5.41 | 67.4 | 57.7 | 43.5 |
| $C_{PM}$ @ 7% O | Concentration, mg/dscm @ 7% $O_2$ | 8.08 | 104.1 | 93.3 | 68.5 |
| $E_{PM}$ | Emission Rate, lb/hr | 0.0351 | 0.434 | 0.383 | 0.284 |
| $E_{PM}$ | Emission Rate, kg/hr | 0.0159 | 0.197 | 0.174 | 0.129 |
| | <u>Cadmium</u> | | | | |
| Cd | Target Catch, µg | 3.55 | 6.7 | 6.33 | 5.51 |
| $C_{Cd}$ | Concentration, mg/dscm | 0.00305 | 0.00598 | 0.00514 | 0.00472 |
| $C_{Cd}$ @ 7% O | Concentration, mg/dscm @ 7% $O_2$ | 0.00455 | 0.00924 | 0.00831 | 0.00737 |
| $E_{Cd}$ | Emission Rate, g/hr | 0.00897 | 0.0175 | 0.0154 | 0.0140 |
| | <u>Lead</u> | | | | |
| Pb | Target Catch, µg | 434.1 | 554 | 481.2 | 489.9 |
| $C_{Pb}$ | Concentration, mg/dscm | 0.373 | 0.498 | 0.391 | 0.420 |
| $C_{Pb}$ @ 7% $O_2$ | Concentration, mg/dscm @ 7% $O_2$ | 0.557 | 0.769 | 0.631 | 0.653 |
| $E_{Pb}$ | Emission Rate, g/hr | 1.10 | 1.45 | 1.17 | 1.24 |
| | <u>Mercury</u> | | | | |
| Hg | Target Catch, µg | 73.0 | 4.41 | 0.55 | 25.99 |
| $C_{Hg}$ | Concentration, mg/dscm | 0.0627 | 0.00396 | 0.000447 | 0.0224 |
| $C_{Hg}$ @ 7% O | Concentration, mg/dscm @ 7% $O_2$ | 0.094 | 0.00612 | 0.000722 | 0.0335 |
| $E_{Hg}$ | Emission Rate, g/hr | 0.184 | 0.0116 | 0.00134 | 0.0658 |

## Summary of Stack Gas Parameters and Test Results
## Malcolm Grow Medical Center - Andrews AFB, MD
## US EPA Test Method 23 - PCDD / PCDF
## Medical Waste Incinerator Stack


| | | | | | |
|---|---|---|---|---|---|
| | *RUN NUMBER* | *M-23-1* | *M-23-2* | *M-23-3* | |
| | *RUN DATE* | *1/31/01* | *1/31/01* | *2/1/01* | *Average* |
| | *RUN TIME* | *1026-1450* | *1610-2040* | *0910-1330* | |
| | MEASURED DATA | | | | |
| $\gamma$ | Meter Box Correction Factor | 0.995 | 0.995 | 0.995 | 0.995 |
| $\Delta H$ | Avg Meter Orifice Pressure, in. $H_2O$ | 1.57 | 1.785 | 1.751 | 1.701 |
| $P_{bar}$ | Barometric Pressure, inches Hg | 29.90 | 29.90 | 29.90 | 29.90 |
| $V_m$ | Sample Volume, $ft^3$ | 172.731 | 182.040 | 180.182 | 178.318 |
| $T_m$ | Average Meter Temperature, °F | 90 | 105 | 100 | 98 |
| $P_{static}$ | Stack Static Pressure, inches $H_2O$ | 0.15 | 0.15 | 0.2 | 0.15 |
| $T_s$ | Average Stack Temperature, °F | 171 | 172 | 172 | 172 |
| $V_{lc}$ | Condensate Collected, ml | 1390.2 | 1256.9 | 1315.4 | 1320.8 |
| $CO_2$ | Carbon Dioxide content, % by volu | 6.0 | 5.9 | 5.4 | 5.8 |
| $O_2$ | Oxygen content, % by volume | 11.4 | 12.1 | 10.8 | 11.4 |
| $N_2$ | Nitrogen content, % by volume | 82.6 | 82.0 | 83.8 | 82.8 |
| $C_p$ | Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 | 0.84 |
| $\Delta p^{1/2}$ | Average Square Root Dp, (in. $H_2O$)[1] | 0.5945 | 0.5783 | 0.5919 | 0.5882 |
| $\Theta$ | Sample Run Duration, minutes | 240 | 240 | 240 | 240 |
| $D_n$ | Nozzle Diameter, inches | 0.310 | 0.310 | 0.310 | 0.310 |
| | CALCULATED DATA | | | | |
| $A_n$ | Nozzle Area, $ft^2$ | 0.00052 | 0.00052 | 0.00052 | 0.00052 |
| $V_{m(std)}$ | Standard Meter Volume, dscf | 165.499 | 169.914 | 169.629 | 168.347 |
| $V_{m(std)}$ | Standard Meter Volume, dscm | 4.686 | 4.811 | 4.803 | 4.767 |
| $P_s$ | Stack Pressure, inches Hg | 29.91 | 29.91 | 29.91 | 29.91 |
| $B_{ws}$ | Moisture, % by volume | 28.3 | 25.8 | 26.7 | 27.0 |
| $B_{ws(sat)}$ | Moisture (at saturation), % by volu | 41.9 | 42.4 | 42.4 | 42.2 |
| $V_{wstd}$ | Standard Water Vapor Volume, $ft^3$ | 65.437 | 59.162 | 61.916 | 62.172 |
| $1-B_{ws}$ | Dry Mole Fraction | 0.717 | 0.742 | 0.733 | 0.730 |
| $M_d$ | Molecular Weight (d.b.), lb/lb•mole | 29.42 | 29.43 | 29.30 | 29.38 |
| $M_s$ | Molecular Weight (w.b.), lb/lb•mole | 26.18 | 26.48 | 26.28 | 26.31 |
| $V_s$ | Stack Gas Velocity, ft/s | 38.3 | 37.1 | 38.1 | 37.8 |
| A | Stack Area, $ft^2$ | 1.289 | 1.289 | 1.289 | 1.289 |
| $Q_a$ | Stack Gas Volumetric flow, acfm | 2,965 | 2,869 | 2,947 | 2,927 |
| $Q_s$ | Stack Gas Volumetric flow, dscfm | 1,776 | 1,777 | 1,803 | 1,785 |
| $Q_{s(cmm)}$ | Stack Gas Volumetric flow, dscmm | 50.3 | 50.3 | 51.1 | 50.6 |
| I | Isokinetic Sampling Ratio, % | 95.5 | 98.0 | 96.4 | 96.6 |

# Summary of Stack Gas Parameters and Test Results
## Malcolm Grow Medical Center - Andrews AFB, MD
## US EPA Test Method 23 - PCDD / PCDF
## Baghouse Inlet


| | RUN NUMBER | M-23-1 | M-23-2 | M-23-3 | |
|---|---|---|---|---|---|
| | RUN DATE | 36922 | 36922 | 36923 | Average |
| | RUN TIME | 1026-1450 | 1610-2040 | 0910-1330 | |
| | EMISSIONS DATA | | | | |
| | DIOXINS: | | | | |
| | 2378 TCDD | | | | |
| (ng) | Catch, ng | (0.000792) | 0.000945 | (0.000580) | (0.000315) |
| (ng/dscm) | Concentration, ng/dscm, as measur | (0.000169) | 0.000196 | (0.000121) | (0.0000655) |
| (µg/hr) | Emission Rate, µg/hr | (0.000510) | 0.000593 | (0.000370) | (0.000198) |
| | Total TCDD | | | | |
| (ng) | Catch, ng | 0.0173 | 0.013 | 0.00393 | 0.01141 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00369 | 0.00270 | 0.000818 | 0.00240 |
| (µg/hr) | Emission Rate, µg/hr | 0.0111 | 0.00816 | 0.00251 | 0.00727 |
| | 12378 PeCDD | | | | |
| (ng) | Catch, ng | {0.00174} | 0.00244 | (0.001630) | (0.00139) |
| (ng/dscm) | Concentration, ng/dscm, as measur | {0.000371} | 0.000507 | (0.000339) | (0.000293) |
| (µg/hr) | Emission Rate, µg/hr | {0.00112} | 0.00153 | (0.00104) | (0.000884) |
| | Total PeCDD | | | | |
| (ng) | Catch, ng | 0.0413 | 0.0313 | 0.0188 | 0.0305 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00881 | 0.00651 | 0.00391 | 0.00641 |
| (µg/hr) | Emission Rate, µg/hr | 0.0266 | 0.0196 | 0.0120 | 0.0194 |
| | 123478 HxCDD | | | | |
| (ng) | Catch, ng | 0.00456 | {0.00196} | 0.00254 | {0.00302} |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.000973 | {0.000407} | 0.000529 | {0.000636} |
| (µg/hr) | Emission Rate, µg/hr | 0.00294 | {0.00123} | 0.00162 | {0.00193} |
| | 123678 HxCDD | | | | |
| (ng) | Catch, ng | 0.00758 | {0.00504} | 0.00463 | {0.00575} |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00162 | {0.00105} | 0.000964 | {0.00121} |
| (µg/hr) | Emission Rate, µg/hr | 0.00488 | {0.00316} | 0.00295 | {0.00367} |

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

# Summary of Stack Gas Parameters and Test Results
## Malcolm Grow Medical Center - Andrews AFB, MD
## US EPA Test Method 23 - PCDD / PCDF
## Baghouse Inlet


| | RUN NUMBER | M-23-1 | M-23-2 | M-23-3 | |
|---|---|---|---|---|---|
| | RUN DATE | 36922 | 36922 | 36923 | Average |
| | RUN TIME | 1026-1450 | 1610-2040 | 0910-1330 | |
| | EMISSIONS DATA -Continued | | | | |
| | DIOXINS - Continued | | | | |
| | 123789 HxCDD | | | | |
| (ng) | Catch, ng | 0.00464 | 0.00276 | {0.00225} | {0.00322} |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.000990 | 0.000574 | {0.000468} | {0.000677} |
| (µg/hr) | Emission Rate, µg/hr | 0.00299 | 0.00173 | {0.00144} | {0.00205} |
| | Total HxCDD | | | | |
| (ng) | Catch, ng | 0.0682 | 0.0429 | 0.0389 | 0.0500 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0146 | 0.00892 | 0.00810 | 0.0105 |
| (µg/hr) | Emission Rate, µg/hr | 0.0439 | 0.0269 | 0.0248 | 0.0319 |
| | 1234678 HpCDD | | | | |
| (ng) | Catch, ng | 0.0273 | 0.0215 | 0.0205 | 0.0231 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00583 | 0.00447 | 0.00427 | 0.00485 |
| (µg/hr) | Emission Rate, µg/hr | 0.0176 | 0.0135 | 0.0131 | 0.0147 |
| | Total HpCDD | | | | |
| (ng) | Catch, ng | 0.0556 | 0.0444 | 0.0415 | 0.0472 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.01186 | 0.00923 | 0.00864 | 0.00991 |
| (µg/hr) | Emission Rate, µg/hr | 0.0358 | 0.0279 | 0.0265 | 0.0300 |
| | 12346789 OCDD | | | | |
| (ng) | Catch, ng | 0.0744 | 0.0571 | 0.0633 | 0.0649 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0159 | 0.0119 | 0.0132 | 0.0136 |
| (µg/hr) | Emission Rate, µg/hr | 0.0479 | 0.0358 | 0.0404 | 0.0414 |
| | Total PCDD | | | | |
| (ng) | Catch, ng | 0.2568 | 0.1887 | 0.16643 | 0.2040 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0548 | 0.0392 | 0.0346 | 0.0429 |
| (µg/hr) | Emission Rate, µg/hr | 0.165 | 0.118 | 0.106 | 0.130 |

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

## Summary of Stack Gas Parameters and Test Results
## Malcolm Grow Medical Center - Andrews AFB, MD
## US EPA Test Method 23 - PCDD / PCDF
## Baghouse Inlet


| | | | | | |
|---|---|---|---|---|---|
| | ***RUN NUMBER*** | ***M-23-1*** | ***I-M23-2*** | ***I-M23-3*** | |
| | ***RUN DATE*** | ***36922*** | ***I-M23-2*** | ***I-M23-3*** | ***Average*** |
| | ***RUN TIME*** | ***1026-1450*** | ***I-M23-2*** | ***I-M23-3*** | |
| | EMISSIONS DATA - Continued | | | | |
| | FURANS | | | | |
| | 2378 TCDF | | | | |
| (ng) | Catch, ng | 0.0113 | 0.00877 | 0.00739 | 0.00915 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00241 | 0.00182 | 0.00154 | 0.00192 |
| (µg/hr) | Emission Rate, µg/hr | 0.00727 | 0.00550 | 0.00471 | 0.00583 |
| | Total TCDF | | | | |
| (ng) | Catch, ng | 0.345 | 0.265 | 0.205 | 0.272 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0736 | 0.0551 | 0.0427 | 0.0571 |
| (µg/hr) | Emission Rate, µg/hr | 0.222 | 0.166 | 0.131 | 0.173 |
| | 12378 PeCDF | | | | |
| (ng) | Catch, ng | 0.0209 | 0.0152 | 0.0116 | 0.0159 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00446 | 0.00316 | 0.00241 | 0.00334 |
| (µg/hr) | Emission Rate, µg/hr | 0.0135 | 0.00954 | 0.00740 | 0.0101 |
| | 23478 PeCDF | | | | |
| (ng) | Catch, ng | 0.0466 | 0.0361 | 0.0265 | 0.0364 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00994 | 0.00750 | 0.00552 | 0.00765 |
| (µg/hr) | Emission Rate, µg/hr | 0.0300 | 0.0227 | 0.0169 | 0.0232 |
| | Total PeCDF | | | | |
| (ng) | Catch, ng | 0.451 | 0.354 | 0.277 | 0.3607 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0962 | 0.0736 | 0.0577 | 0.07583 |
| (µg/hr) | Emission Rate, µg/hr | 0.290 | 0.222 | 0.177 | 0.2297 |
| | 123478 HxCDF | | | | |
| (ng) | Catch, ng | 0.0489 | 0.04 | 0.0289 | 0.0393 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0104 | 0.00831 | 0.00602 | 0.00825 |
| (µg/hr) | Emission Rate, µg/hr | 0.0315 | 0.0251 | 0.0184 | 0.0250 |

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

## Summary of Stack Gas Parameters and Test Results
## Malcolm Grow Medical Center - Andrews AFB, MD
## US EPA Test Method 23 - PCDD / PCDF
## Baghouse Inlet


| | RUN NUMBER | M-23-1 | M-23-2 | M-23-3 | |
|---|---|---|---|---|---|
| | RUN DATE | 36922 | 36922 | 36923 | Average |
| | RUN TIME | 1026-1450 | 1610-2040 | 0910-1330 | |
| | EMISSIONS DATA - Continued | | | | |
| | Furans - Continued | | | | |
| | 123678 HxCDF | | | | |
| (ng) | Catch, ng | 0.0546 | 0.0457 | 0.0355 | 0.0453 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.011651 | 0.009 | 0.00739 | 0.00951 |
| (µg/hr) | Emission Rate, µg/hr | 0.03515 | 0.03 | 0.023 | 0.0288 |
| | 234678 HxCDF | | | | |
| (ng) | Catch, ng | 0.0873 | 0.0737 | 0.0602 | 0.0737 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0186 | 0.0153 | 0.0125 | 0.0155 |
| (µg/hr) | Emission Rate, µg/hr | 0.0562 | 0.0463 | 0.0384 | 0.0470 |
| | 123789 HxCDF | | | | |
| (ng) | Catch, ng | 0.0137 | 0.0111 | 0.00899 | 0.0113 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00292 | 0.00231 | 0.00187 | 0.00237 |
| (µg/hr) | Emission Rate, µg/hr | 0.00882 | 0.00697 | 0.00573 | 0.00717 |
| | Total HxCDF | | | | |
| (ng) | Catch, ng | 0.517 | 0.441 | 0.345 | 0.434 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.110 | 0.0917 | 0.0718 | 0.0913 |
| (µg/hr) | Emission Rate, µg/hr | 0.333 | 0.277 | 0.220 | 0.277 |
| | 1234678 HpCDF | | | | |
| (ng) | Catch, ng | 0.234 | 0.208 | 0.172 | 0.205 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0499 | 0.0432 | 0.0358 | 0.0430 |
| (µg/hr) | Emission Rate, µg/hr | 0.151 | 0.131 | 0.110 | 0.130 |
| | 1234789 HpCDF | | | | |
| (ng) | Catch, ng | 0.0265 | 0.0222 | 0.0188 | 0.0225 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00565 | 0.00461 | 0.00391 | 0.00473 |
| (µg/hr) | Emission Rate, µg/hr | 0.0171 | 0.0139 | 0.0120 | 0.0143 |

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

## Summary of Stack Gas Parameters and Test Results
## Malcolm Grow Medical Center - Andrews AFB, MD
## US EPA Test Method 23 - PCDD / PCDF
## Baghouse Inlet


| | | | | | |
|---|---|---|---|---|---|
| | ***RUN NUMBER*** | ***M-23-1*** | ***M-23-2*** | ***M-23-3*** | |
| | ***RUN DATE*** | ***36922*** | ***36922*** | ***36923*** | ***Average*** |
| | ***RUN TIME*** | ***1026-1450*** | ***1610-2040*** | ***0910-1330*** | |
| | EMISSIONS DATA - Continued | | | | |
| | Furans - Continued | | | | |
| | Total HpCDF | | | | |
| (ng) | Catch, ng | 0.37 | 0.328 | 0.274 | 0.324 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0790 | 0.0682 | 0.0570 | 0.0681 |
| (µg/hr) | Emission Rate, µg/hr | 0.238 | 0.206 | 0.175 | 0.206 |
| | 12346789 OCDF | | | | |
| (ng) | Catch, ng | 0.145 | 0.118 | 0.113 | 0.125 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0309 | 0.0245 | 0.0235 | 0.0263 |
| (µg/hr) | Emission Rate, µg/hr | 0.0934 | 0.0741 | 0.0721 | 0.0798 |
| | Total PCDF | | | | |
| (ng) | Catch, ng | 1.828 | 1.506 | 1.214 | 1.516 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.390 | 0.313 | 0.253 | 0.319 |
| (µg/hr) | Emission Rate, µg/hr | 1.18 | 0.945 | 0.774 | 0.965 |
| | Total PCDD + PCDF | | | | |
| (ng) | Catch, ng | 2.085 | 1.695 | 1.380 | 1.720 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.445 | 0.352 | 0.287 | 0.361 |
| (µg/hr) | Emission Rate, µg/hr | 1.34 | 1.06 | 0.881 | 1.10 |

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

**CDD/CDF Corrected Stack Gas Concentrations and 2378 TCDD Toxic Equivalent Concentrations**
**Malcolm Grow Medical Center - Andrews AFB, MD**
**US EPA Test Method 23 - CDD/CDF**
**Medical Waste Incinerator Stack**

| | CONCENTRATION (ng/dscmm, adjusted to 7% O2) | | | | 2378-TCDD Toxic Equivalent Factor | 2378 TOXIC EQUIVALENCIES (ng/dscmm, adjusted to 7% O2) | | | |
|---|---|---|---|---|---|---|---|---|---|
| RUN NUMBER | M-23-1 | M-23-2 | M-23-3 | | | M-23-1 | M-23-2 | M-23-3 | |
| RUN DATE | 1/31/01 | 1/31/01 | 2/1/01 | Average | | 1/31/01 | 1/31/01 | 2/1/01 | Average |
| RUN TIME | 1026-1450 | 1610-2040 | 0910-1330 | | | 1026-1450 | 1610-2040 | 0910-1330 | |
| DIOXINS: | | | | | | | | | |
| 2378 TCDD | (0.000247) | 0.000310 | (0.000166) | (0.000096) | 1.000 | (0.000247) | 0.000310 | (0.000166) | (0.000096) |
| Total TCDD | 0.00540 | 0.00427 | 0.00113 | 0.00353 | | | | | |
| 12378 PeCDD | {0.000543} | 0.000801 | (0.000467) | (0.000430) | 0.500 | {0.000272} | 0.000401 | (0.000234) | (0.000215) |
| Total PeCDD | 0.0129 | 0.0103 | 0.00539 | 0.0094 | | | | | |
| 123478 HxCDD | 0.00142 | {0.000643} | 0.000728 | {0.000934} | 0.100 | 0.000142 | ########## | 0.0000728 | ########## |
| 123678 HxCDD | 0.00237 | {0.00165} | 0.0013 | {0.00178} | 0.100 | 0.000237 | {0.000165} | 0.000133 | {0.000178} |
| 123789 HxCDD | 0.00145 | 0.000906 | {0.000645} | {0.000995} | 0.100 | 0.000145 | 0.0000906 | ########## | ########## |
| Total HxCDD | 0.0213 | 0.0141 | 0.0111 | 0.0155 | | | | | |
| 1234678 HpCDD | 0.00852 | 0.00706 | 0.00587 | 0.00713 | 0.010 | 0.0000852 | 0.0000706 | 0.0000587 | 0.0000713 |
| Total HpCDD | 0.0174 | 0.0146 | 0.0119 | 0.0146 | | | | | |
| 12346789 OCDD | 0.0232 | 0.0187 | 0.0181 | 0.0200 | 0.001 | 0.0000232 | 0.0000187 | 0.0000181 | 0.0000200 |
| Total CDD | 0.0802 | 0.0619 | 0.0477 | 0.0630 | | {0.000904} | {0.00112} | {0.000347} | {0.000773} |
| FURANS: | | | | | | | | | |
| 2378 TCDF | 0.00353 | 0.00288 | 0.00212 | 0.00283 | 0.100 | 0.000353 | 0.000288 | 0.000212 | 0.000283 |
| Total TCDF | 0.108 | 0.0870 | 0.0587 | 0.0839 | | | | | |
| 12378 PeCDF | 0.00653 | 0.00499 | 0.00332 | 0.00491 | 0.050 | 0.000326 | 0.000250 | 0.000166 | 0.000246 |
| 23478 PeCDF | 0.0145 | 0.0119 | 0.00759 | 0.0112 | 0.500 | 0.00727 | 0.00593 | 0.00380 | 0.00562 |
| Total PeCDF | 0.141 | 0.116 | 0.0794 | 0.111 | | | | | |
| 123478 HxCDF | 0.0153 | 0.0131 | 0.0083 | 0.0121 | 0.100 | 0.00153 | 0.00131 | 0.000828 | 0.00121 |
| 123678 HxCDF | 0.0170 | 0.0150 | 0.0102 | 0.0140 | 0.100 | 0.00170 | 0.00150 | 0.00102 | 0.00140 |
| 234678 HxCDF | 0.0273 | 0.0242 | 0.0172 | 0.0227 | 0.100 | 0.00273 | 0.00242 | 0.00172 | 0.00227 |
| 123789 HxCDF | 0.00428 | 0.00364 | 0.00258 | 0.00348 | 0.100 | 0.000428 | 0.000364 | 0.000258 | 0.000348 |
| Total HxCDF | 0.161 | 0.145 | 0.0988 | 0.134 | | | | | |
| 1234678 HpCDF | 0.0731 | 0.0683 | 0.0493 | 0.0631 | 0.010 | 0.000731 | 0.000683 | 0.000493 | 0.000631 |
| 1234789 HpCDF | 0.00827 | 0.00729 | 0.00539 | 0.00694 | 0.010 | 0.0000827 | 0.0000729 | 0.0000539 | 0.0000694 |
| Total HpCDF | 0.116 | 0.108 | 0.0785 | 0.100 | | | | | |
| 12346789 OCDF | 0.0453 | 0.0387 | 0.0324 | 0.0387 | 0.001 | 0.0000453 | 0.0000387 | 0.0000324 | 0.0000387 |
| Total CDF | 0.571 | 0.494 | 0.348 | 0.468 | | 0.0152 | 0.0129 | 0.00858 | 0.0121 |
| Total CDD + CDF | 0.651 | 0.556 | 0.396 | 0.531 | | {0.0161} | {0.0140} | {0.00893} | {0.0130} |

( ) Indicates value in parentheses is based on the Detection Limit (sample was Not Detected). A total or average value in parentheses means the value includes one or more zero (0) values used in place of the detection limit based value.

{} Indicates the value is based on an EMPC value. The value is used as is in totals and averages.

## Summary of Stack Gas Parameters and Test Results
## Air Emissions Test
## Malcolm Grow Medical Center - Andrews AFB, MD
## US EPA Test Method 26 - HCl
## Medical Waste Incinerator Stack


| | | | | | |
|---|---|---|---|---|---|
| | RUN NUMBER | M26-1 | M26-3 | M26-4 | |
| | RUN DATE | 1/31/01 | 2/1/01 | 2/2/01 | Average |
| | RUN TIME | 1045-1145 | 0910-1010 | 0945-1045 | |
| | MEASURED DATA | | | | |
| $\gamma$ | Meter Box Correction Factor | 1.004 | 1.004 | 1.004 | 1.004 |
| $P_{bar}$ | Barometric Pressure, inches Hg | 29.90 | 29.90 | 29.90 | 29.90 |
| $V_m$ | Sample Volume, $ft^3$ | 120.100 | 119.810 | 120.440 | 120.117 |
| $\Delta H$ | Avg Meter Orifice Pressure, in. H | 2.20 | 2.20 | 2.20 | 2.20 |
| $T_m$ | Average Meter Temperature, °F | 89.6 | 109.3 | 90 | 96.2 |
| $CO_2$ | Carbon Dioxide content, % by vol | 5.8 | 6.1 | 6.3 | 6.1 |
| $O_2$ | Oxygen content, % by volume | 11.3 | 11.9 | 11.6 | 11.6 |
| $\Theta$ | Sample Run Duration, minutes | 60 | 60 | 60 | 60 |
| | CALCULATED DATA | | | | |
| $V_{sc}$ | Standard Meter Volume, liters | 116.347 | 112.056 | 116.659 | 115.021 |
| $V_{m(std)}$ | Standard Meter Volume, $ft^3$ | 4.109 | 3.957 | 4.120 | 4.062 |
| $V_{m(std)}$ | Standard Meter Volume, $m^3$ | 0.116 | 0.112 | 0.117 | 0.115 |
| $Q_m$ | Average Sampling Rate, lpm | 1.94 | 1.87 | 1.94 | 1.92 |
| | EMISSIONS DATA | | | | |
| | Chlorides as HCl | | | | |
| | Catch Mass, mg | 2.8 | 0.3 | 1.1 | |
| $F_{Wt}$ | Formula Weight, lb/lb-mol | 36.47 | 36.47 | 36.47 | |
| $C_{ppmvd}$ | Concentration, ppm by volume | 15.9 | 1.77 | 6.22 | 7.95 |
| $C_{ppm7\%O2}$ | Concentration, ppm by vol. at 7% | 23.0 | 2.73 | 9.29 | 11.7 |

# APPENDIX E
# QA/QC DATA

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

## Initial Dry Gas Meter Calibration Form (English Units)

Date: 1/22/01 Calibrator: DDH Meter Box (DGM) No.: **RMB-15**

$P_{bar}$, in Hg 30.00 Reference Meter Correction Factor: 1.0077 (10/5/97, 09/28/98, & 09/10/99)

$\Delta H$ = 0.5

| Trial | Trial Duration (min) | Dry Gas Meter RMB-15 Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Inlet Initial | Inlet Final | Inlet Avg. | Outlet Initial | Outlet Final | Outlet Avg. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 464.354 | 470.464 | 6.110 | 72 | 73 | 72.5 | 70 | 70 | 70 |
| 2 | 15 | 470.464 | 476.579 | 6.115 | 72 | 73 | 72.5 | 70 | 70 | 70 |
| 3 | 15 | 476.579 | 482.679 | 6.100 | 72 | 75 | 73.5 | 70 | 71 | 70.5 |

| Trial | Reference Meter Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Initial | Final | Avg. | DGM Correction Factor $\gamma$ | Reference Orifice Press $\Delta H_@$ (in. $H_2O$) |
|---|---|---|---|---|---|---|---|---|
| 1 | 567.537 | 573.492 | 5.955 | 64 | 64 | 64 | 0.995 | 1.719 |
| 2 | 573.492 | 579.425 | 5.933 | 64 | 64 | 64 | 0.990 | 1.732 |
| 3 | 579.425 | 585.363 | 5.938 | 64 | 64 | 64 | 0.995 | 1.726 |

$\Delta H$ = 0.75

| Trial | Trial Duration (min) | Dry Gas Meter RMB-15 Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Inlet Initial | Inlet Final | Inlet Avg. | Outlet Initial | Outlet Final | Outlet Avg. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 499.123 | 506.571 | 7.448 | 74 | 74 | 74 | 72 | 72 | 72 |
| 2 | 15 | 506.571 | 514.037 | 7.466 | 74 | 74 | 74 | 72 | 72 | 72 |
| 3 | 15 | 514.037 | 521.456 | 7.419 | 74 | 75 | 74.5 | 72 | 71 | 71.5 |

| Trial | Reference Meter Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Initial | Final | Avg. | DGM Correction Factor $\gamma$ | Reference Orifice Press $\Delta H_@$ (in. $H_2O$) |
|---|---|---|---|---|---|---|---|---|
| 1 | 589.234 | 596.489 | 7.255 | 64 | 64 | 64 | 0.997 | 1.733 |
| 2 | 596.489 | 603.728 | 7.239 | 64 | 64 | 64 | 0.992 | 1.740 |
| 3 | 603.728 | 610.967 | 7.239 | 64 | 64 | 64 | 0.998 | 1.740 |

$\Delta H$ = 1.0

| Trial | Trial Duration (min) | Dry Gas Meter RMB-15 Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Inlet Initial | Inlet Final | Inlet Avg. | Outlet Initial | Outlet Final | Outlet Avg. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 540.356 | 546.014 | 5.658 | 74 | 75 | 74.5 | 72 | 72 | 72 |
| 2 | 10 | 546.014 | 551.686 | 5.672 | 74 | 75 | 74.5 | 72 | 72 | 72 |
| 3 | 10 | 551.686 | 557.344 | 5.658 | 74 | 76 | 75 | 72 | 72 | 72 |

| Trial | Reference Meter Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Initial | Final | Avg. | DGM Correction Factor $\gamma$ | Reference Orifice Press $\Delta H_@$ (in. $H_2O$) |
|---|---|---|---|---|---|---|---|---|
| 1 | 621.021 | 626.53 | 5.509 | 64 | 64 | 64 | 0.996 | 1.781 |
| 2 | 626.530 | 632.000 | 5.470 | 64 | 64 | 64 | 0.987 | 1.806 |
| 3 | 632.000 | 637.500 | 5.500 | 64 | 64 | 64 | 0.995 | 1.786 |

PACIFIC ENVIRONMENTAL SERVICES, INC.
Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

## Initial Dry Gas Meter Calibration Form (English Units)

Date: 1/22/01 Calibrator: DDH Meter Box (DGM) No.: **RMB-15**

$P_{bar}$, in Hg 30.00 Reference Meter Correction Factor: 1.0077 (10/5/97, 09/28/98, & 09/10/99)

$\Delta H$ = 2.0 — Dry Gas Meter RMB-15

| Trial | Trial Duration (min) | Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Inlet Initial | Inlet Final | Inlet Avg. | Outlet Initial | Outlet Final | Outlet Avg. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 568.937 | 574.407 | 5.470 | 68 | 67 | 67.5 | 67 | 67 | 67 |
| 2 | 7 | 574.407 | 579.882 | 5.475 | 68 | 67 | 67.5 | 67 | 67 | 67 |
| 3 | 7 | 579.882 | 585.360 | 5.478 | 68 | 67 | 67.5 | 67 | 67 | 67 |

| Trial | Reference Meter Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Initial | Final | Avg. | DGM Correction Factor $\gamma$ | Reference Orifice Press $\Delta H_@$ (in. $H_2O$) |
|---|---|---|---|---|---|---|---|---|
| 1 | 645.018 | 650.368 | 5.350 | 64 | 62 | 63 | 0.989 | 1.869 |
| 2 | 650.368 | 655.738 | 5.370 | 64 | 62 | 63 | 0.992 | 1.855 |
| 3 | 655.738 | 661.113 | 5.375 | 64 | 62 | 63 | 0.992 | 1.852 |

$\Delta H$ = 4.0 — Dry Gas Meter RMB-15

| Trial | Trial Duration (min) | Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Inlet Initial | Inlet Final | Inlet Avg. | Outlet Initial | Outlet Final | Outlet Avg. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 600.198 | 605.660 | 5.462 | 74 | 74 | 74 | 72 | 73 | 72.5 |
| 2 | 5 | 605.660 | 611.129 | 5.469 | 74 | 74 | 74 | 72 | 73 | 72.5 |
| 3 | 5 | 611.129 | 616.609 | 5.480 | 74 | 73 | 73.5 | 72 | 73 | 72.5 |

| Trial | Reference Meter Gas Volume ($ft^3$) Initial | Final | Net | Meter Temperatures (°F) Initial | Final | Avg. | DGM Correction Factor $\gamma$ | Reference Orifice Press $\Delta H_@$ (in. $H_2O$) |
|---|---|---|---|---|---|---|---|---|
| 1 | 680.287 | 685.679 | 5.392 | 64 | 64 | 64 | 1.003 | 1.873 |
| 2 | 685.679 | 691.070 | 5.391 | 64 | 64 | 64 | 1.001 | 1.873 |
| 3 | 691.070 | 696.461 | 5.391 | 64 | 64 | 64 | 0.999 | 1.874 |

Calibration Results

| $\Delta H$ | $\gamma$ | $\Delta H_@$ |
|---|---|---|
| 0.50 | 0.993 | 1.73 |
| 0.75 | 0.996 | 1.74 |
| 1.0 | 0.992 | 1.79 |
| 2.0 | 0.991 | 1.86 |
| 4.0 | 1.001 | 1.87 |

**Dry Gas Meter RMB-15 on 01/22/01**

| | |
|---|---|
| Meter Box Calibration Factor | **0.995** |
| Meter Box Reference Orifice Pressure | **1.80** |

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

## Posttest Dry Gas Meter Calibration Form (English Units)

Pretest Calibration Factor 0.995
System Vacuum Setting, (in Hg) 3
Reference Meter Correction Factor 1.0077 (10/5/97, 09/28/98, & 09/10/99)
Date: 2/8/01 $P_{bar}$, in Hg 29.90 Calibrator: D. Holzschuh Meter Box No.: **RMB-15**

$\Delta H$ = 1.8

| | | Dry Gas Meter RMB-15 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Trial | Duration (min) | Initial ($ft^3$) | Final ($ft^3$) | Net ($ft^3$) | Initial, Inlet (°F) | Final, Inle (°F) | Avg. Inlet (°F) | Initial, Outlet (°F) | Final, Outlet (°F) | Avg. Outlet (°F) |
| 1 | 10 | 998.189 | 1005.909 | 7.720 | 76 | 75 | 75.5 | 76 | 74 | 75 |
| 2 | 10 | 1005.909 | 1013.604 | 7.695 | 76 | 75 | 75.5 | 76 | 74 | 75 |
| 3 | 10 | 1013.604 | 1021.302 | 7.698 | 76 | 74 | 75 | 76 | 74 | 75 |

| | Reference Meter | | | | | | Meter Box Correction Factor |
|---|---|---|---|---|---|---|---|
| | Gas Volume | | | Meter Temperature | | | |
| Trial | Initial ($ft^3$) | Final ($ft^3$) | Net ($ft^3$) | Initial (°F) | Final (°F) | Avg. (°F) | $\gamma$ |
| 1 | 945.198 | 952.898 | 7.700 | 74 | 74 | 74 | 1.003 |
| 2 | 952.898 | 960.579 | 7.681 | 74 | 74 | 74 | 1.004 |
| 3 | 960.579 | 968.264 | 7.685 | 74 | 74 | 74 | 1.003 |

AVERAGE: 1.0034
% Change: 0.84% PASS

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

# Vost Pretest Dry Gas Meter Calibration Form (English Units)

Pretest Calibration Factor 1.004
System Vacuum Setting, (in Hg) 3
Reference Meter Correction Factor N/A
Date: 06/08/00 $P_{bar}$, in Hg 30.00 Calibrator: DDH Meter Box No.: V-6

| | | Vost DGM, liters | | | Buck Meter, cc/min | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Trial | Duration (min) | Initial Liters | Final Liters | Net Liters | CC | CC | CC | CC | CC | CC |
| 1 | 10 | 0 | 9.712 | 9.712 | 979 | 972 | 973 | 974 | 970 | 971 |
| 2 | 10 | 9.712 | 19.348 | 9.636 | 981 | 971 | 968 | 973 | 971 | 972 |
| 3 | 10 | 19.348 | 28.939 | 9.591 | 977 | 977 | 969 | 958 | 967 | 978 |

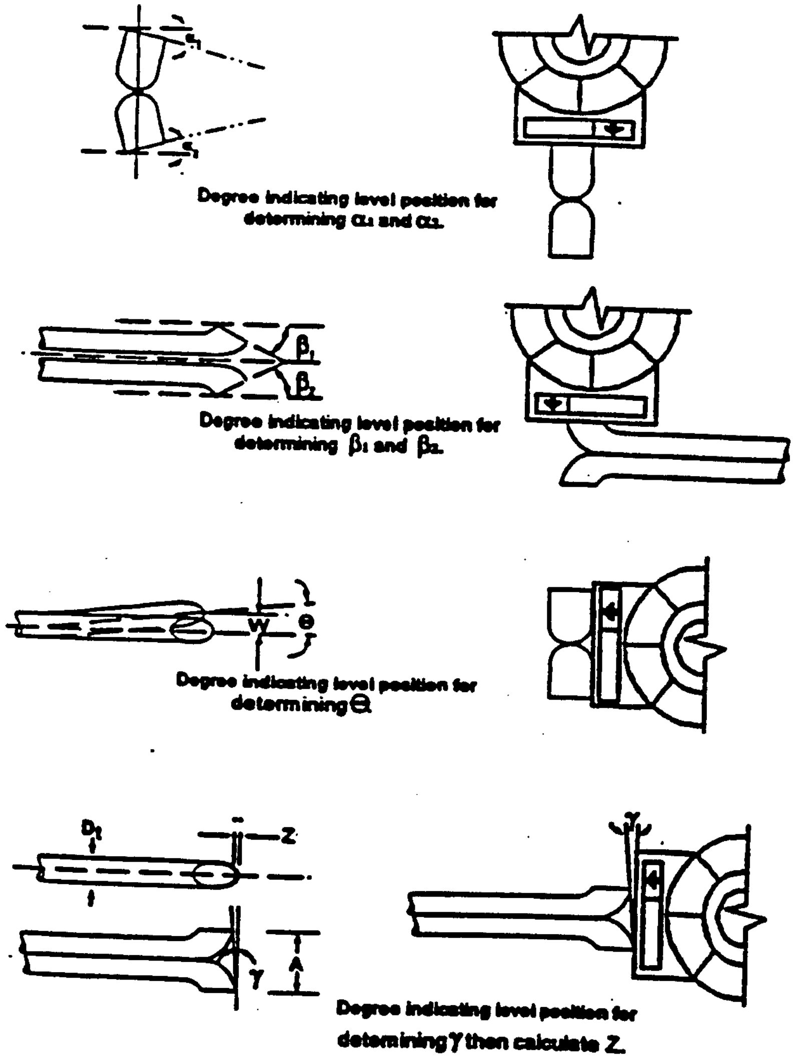
| | Reference Meter Gas Volume, cc/minute | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Trial | CC | CC | CC | CC | CC | AVG CC/min | Average lpm | $\gamma$ |
| 1 | 972 | 980 | 969 | 972 | 977 | 973.55 | 9.735 | 1.002 |
| 2 | 981 | 985 | 985 | 982 | 970 | 976.27 | 9.763 | 1.013 |
| 3 | 988 | 981 | 983 | 990 | 974 | 976.55 | 9.765 | 1.018 |

| | |
|---|---|
| GAMMA | 1.011 |
| % Change | |

V

Printed: 06/08/00

**CALIBRATION DATA SHEET 2**
**Type S Pitot Tube Inspection**




| | |
|---|---|
| Level and Perpendicular? | YES |
| Obstruction? | NO |
| Damaged? | NO |
| $\alpha_1$ $(-10° \leq \alpha_1 \leq +10°)$ | 0 |
| $\alpha_2$ $(-10° \leq \alpha_2 \leq +10°)$ | 1 |
| $\beta_1$ $(-5° \leq \beta_1 \leq +5°)$ | 0 |
| $\beta_2$ $(-5° \leq \beta_2 \leq +5°)$ | 1 |
| $\gamma$ | 0 |
| $\Theta$ | 0 |
| $z = A \tan \gamma$ $(\leq 0.125")$ | 0 |
| $w = A \tan \Theta$ $(\leq 0.03125")$ | 0 |
| $D_t$ $(3/16" \leq D_t \leq 3/8")$ | 3/8 |
| A | .938 |
| $A/2D_t$ $(1.05 \leq P_A/D_t \leq 1.5)$ | 1.25 |

***QA/QC Check***
Completeness ____ Legibility ____ Accuracy ____ Specifications ____ Reasonableness ____

***Certification***
I certify that the Type S pitot tube/probe ID# RP-19 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor $C_p$ of 0.84.

Certified by: D Brown 7-14-98
Personnel (Signature/Date)

Team Leader (Signature/Date)

# TEMPERATURE SENSOR CALIBRATION FORM

Temperature Sensor No. RT-6 Sensor Type K TYPE Length 4'
Ambient Temp. °F 68 Barometric Pressure, "Hg 29.95
Reference Temp. Sensor: 68

| Date | Ref. Point No. | Temp. Source | Temp. °F | | Temp. Diff. % | Within Limits Y/N | Calibrated By |
|---|---|---|---|---|---|---|---|
| | | | Ref. Sensor | Test Sensor | | | |
| 02/14/89 | 1 | ICE H2O | 32 | 32 | 0 | Y | DDH |
| | 2 | AMBIENT AIR | 71 | 68 | -.65 | Y | DDH |
| | 3 | Boiling H2O | 210 | 210 | 0 | Y | DDH |
| | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |

$$\% \text{ Temp. Diff} = \frac{(\text{Ref. Temp} + 460) - (\text{Test Temp.} + 460)}{(\text{Ref. Temp.} + 460)} \times 100 \leq 1.5\,\%$$

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

# CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Pacific Env. Services Inc.
**SGI ORDER # :** 147414
**ITEM# :** 7
**P.O.# :** 104-00-0061/62/63

**CYLINDER # :** CC88665
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 350

**CERTIFICATION DATE:** 11/02/99
**EXPIRATION DATE:** 11/02/2002

### CERTIFICATION HISTORY

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 10/26/99<br>11/02/99 | 30.42 ppm<br>30.09 ppm | 30.2 ppm | +/- 1% |
| | | | | |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

### REFERENCE STANDARDS

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81679 | CC88366 | 97.4 ppm |
| | | | |
| | | | |
| | | | |

### INSTRUMENTATION

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 10/26/99 |
| | | | | |
| | | | | |
| | | | | |

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FP
FRED PIKULA

DATE: 11/02/99

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Pacific Env. Services Inc.
**SGI ORDER # :** 147414
**ITEM# :** 6
**P.O.# :** 104-00-0061/62/63

**CYLINDER # :** CC88530
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 350

**CERTIFICATION DATE:** 11/02/99
**EXPIRATION DATE:** 11/02/2002

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 10/26/99<br>11/02/99 | 59.64 ppm<br>59.31 ppm | 59.5 ppm | +/- 1% |
| | | | | |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81679 | CC88366 | 97.4 ppm |
| | | | |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 10/26/99 |
| | | | | |
| | | | | |
| | | | | |

**THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

ANALYST: ________
FRED PIKULA

DATE: 11/02/99

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

# CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Pacific Env. Services Inc.
**SGI ORDER # :** 147414
**ITEM# :** 5
**P.O.# :** 104-00-0061/62/63

**CYLINDER # :** CC88495
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 350

**CERTIFICATION DATE:** 11/02/99
**EXPIRATION DATE:** 11/02/2002

CERTIFICATION HISTORY

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 10/26/99<br>11/02/99 | 89.79 ppm<br>89.60 ppm | 89.7 ppm | +/- 1% |
| | | | | |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

REFERENCE STANDARDS

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81679 | CC88366 | 97.4 ppm |
| | | | |
| | | | |
| | | | |

INSTRUMENTATION

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 10/26/99 |
| | | | | |
| | | | | |
| | | | | |

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FP
FRED PIKULA

DATE: 11/02/99

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

# CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Pacific Env. Services Inc.
**SGI ORDER # :** 162038
**ITEM# :** 3
**P.O.# :** 104-01-0017

**CYLINDER # :** CC114216
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 12/28/2000
**EXPIRATION DATE:** 12/28/2003

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Oxygen | 12/28/2000 | 12.53 % | 12.53 % | +/- 1% |
| Carbon Dioxide | 12/28/2000 | 10.04 % | 10.04 % | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Oxygen | NTRM-82659x | CC83908 | 22.8 % |
| Carbon Dioxide | NTRM-82745x | CC79944 | 20.00 % |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Oxygen | Horiba MPA-510 | 570694081 | PM | 12/15/2000 |
| Carbon Dioxide | Horiba VIA-510 | 571417045 | NDIR | 12/6/2000 |
| | | | | |
| | | | | |

**THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES. DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

**ANALYST:** ~~FP~~
**FRED PIKULA**

**DATE:** 12/28/2000

**SPECTRA GASES INC.**

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G2

**CUSTOMER:** Pacific Env. Services Inc.
**SGI ORDER # :** 147409
**ITEM# :** 5
**P.O.# :** 104-00-0063/0064

**CYLINDER # :** CC91083
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 10/27/99
**EXPIRATION DATE:** 10/27/2002

CERTIFICATION HISTORY

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Oxygen | 10/27/99 | 22.4 % | 22.4 % | +/- 1% |
| Carbon Dioxide | 10/27/99 | 22.4 % | 22.4 % | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

REFERENCE STANDARDS

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Oxygen | NTRM-82659X | CC83900 | 22.80 % |
| Carbon Dioxide | NTRM-82745x | CC79944 | 20.00 % |
| | | | |
| | | | |

INSTRUMENTATION

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Oxygen | Horiba MPA-510 | 570694081 | PM | 10/26/99 |
| Carbon Dioxide | Horiba VIA-510 | 571417045 | NDIR | 10/27/99 |
| | | | | |
| | | | | |

**THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

**ANALYST:** [signature]
**FRED PIKULA**

**DATE:** 10/27/99

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Cherokee Instruments Inc.
**SGI ORDER # :** 156722
**ITEM# :** 6
**P.O.# :** 3818

**CYLINDER # :** CC55783
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 660

**CERTIFICATION DATE:** 8/10/2000
**EXPIRATION DATE:** 8/10/2002

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Sulfur Dioxide | 8/2/2000<br>8/10/2000 | 45.04 ppm<br>45.17 ppm | 45.1 ppm | +/- 1% |
| | | | | |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Sulfur Dioxide | NTRM-81694 | CC55796 | 96.0 ppm |
| | | | |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Sulfur Dioxide | Horiba VIA-510 | 851221093 | NDIR | 7/28/2000 |
| | | | | |
| | | | | |
| | | | | |

**THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

**ANALYST:** [signature]
**FRED PIKULA**

**DATE:** 8/10/2000

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

Air Products and Chemicals, Inc. * 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

# CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

**Customer:**
AIR PRODUCTS AND CHEMICALS, INC.
4822 INDUSTRY LANE
UDI BUSINESS PARK
DURHAM NC 27709

Order No: CSS-190592-01
Batch No: 861-59105
PO:
Release:

Cylinder No: SG9119904BAL
Bar Code No: DWJ098
Cylinder Pressure*: 2000 psig
Certification Date: 06/26/1999
Expiration Date: 06/26/2001

| CERTIFIED CONCENTRATION | | REFERENCE STANDARDS | | | ANALYTICAL INSTRUMENTATION | | | |
|---|---|---|---|---|---|---|---|---|
| Component | Certified Concentration | Cylinder Number | Standard Type | Standard Concentration | Instrument Make/Model | Serial Number | Last Calibration | Measurement Principal |
| SULFUR DIOXIDE | 91.7 ±1.7 PPM | SG9150968BAL | NTRM 81661X | 169.7 PPM | HORIBA VIA-510 | 85079208 | 06/18/99 | NON DISPERSIVE INFRARED |
| NITROGEN | Balance Gas | | | | | | | |

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: James Lans

Approved By: Richard Fry

(16921) No. 320-9702

RATA CLASS

# Scott Specialty Gases

*Dual-Analyzed Calibration Standard*

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

## CERTIFICATE OF ACCURACY: EPA Protocol Gas

**Assay Laboratory**

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 103-00-292
Project No.: 05-70839-002

**Customer**

PACIFIC ENVIRONMENTAL SERVICES,INC
BRUCE SAVEN
7209 E. KEMPER RD
CINCINNATI OH 45249-1030

## ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM031852 **Certification Date:** 12/14/00 **Exp. Date:** 12/13/2002
Cylinder Pressure***: 1900 PSIG

| COMPONENT | CERTIFIED CONCENTRATION (Moles) | | ANALYTICAL ACCURACY** | TRACEABILITY |
|---|---|---|---|---|
| NITRIC OXIDE | 254.13 | PPM | +/- 1% | Direct NIST and NMi |
| NITROGEN - OXYGEN FREE | | BALANCE | | |
| TOTAL OXIDES OF NITROGEN | 254.9 | PPM | | Reference Value Only |

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

## REFERENCE STANDARD

| TYPE/SRM NO. | EXPIRATION DATE | CYLINDER NUMBER | CONCENTRATION | COMPONENT |
|---|---|---|---|---|
| NTRM 1687 | 3/01/03 | ALM024630 | 1000. PPM | NITRIC OXIDE |

## INSTRUMENTATION

| INSTRUMENT/MODEL/SERIAL# | DATE LAST CALIBRATED | ANALYTICAL PRINCIPLE |
|---|---|---|
| BECKMAN/951/010177 | 12/14/00 | CHEMILUMINESCENCE |

## ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

**NITRIC OXIDE**

**First Triad Analysis**

| Date:12/06/00 | Response Unit:MV | |
|---|---|---|
| Z1=0.00000 | R1=100.0000 | T1=101.7000 |
| R2=100.0000 | Z2=0.00000 | T2=101.5000 |
| Z3=0.00000 | T3=101.5000 | R3=100.0000 |
| Avg. Concentration: | 253.4 | PPM |

**Second Triad Analysis**

| Date: 12/14/00 | Response Unit: MV | |
|---|---|---|
| Z1=0.00000 | R1=100.0000 | T1=51.60000 |
| R2=100.0000 | Z2=0.00000 | T2=51.60000 |
| Z3=0.00000 | T3=51.60000 | R3=100.0000 |
| Avg. Concentration: | 254.9 | PPM |

**Calibration Curve**

| Concentration=A+Bx+Cx2+Dx3+Ex4 | |
|---|---|
| r=.999992785 | 1686 |
| Constants: | A=1.220822425 |
| B=10.000876060 | C=0 |
| D=0 | E=0 |

APPROVED BY:

~~RATA CLASS~~

# Scott Specialty Gases

*Dual-Analyzed Calibration Standard*

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

## CERTIFICATE OF ACCURACY: EPA Protocol Gas

**Assay Laboratory**

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 103-00-292
Project No.: 05-70839-003

**Customer**

PACIFIC ENVIRONMENTAL SERVICES,INC
BRUCE SAVEN
7209 E. KEMPER RD
CINCINNATI OH 45249-1030

### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

**Cylinder Number:** AAL18927 **Certification Date:** 12/14/00 **Exp. Date:** 12/14/2002
**Cylinder Pressure***:** 1900 PSIG

| COMPONENT | CERTIFIED CONCENTRATION (Moles) | | ANALYTICAL ACCURACY** | TRACEABILITY |
|---|---|---|---|---|
| NITRIC OXIDE | 472.4 | PPM | +/- 1% | Direct NIST and NMi |
| NITROGEN - OXYGEN FREE | | BALANCE | | |
| TOTAL OXIDES OF NITROGEN | 473.1 | PPM | | Reference Value Only |

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

### REFERENCE STANDARD

| TYPE/SRM NO. | EXPIRATION DATE | CYLINDER NUMBER | CONCENTRATION | COMPONENT |
|---|---|---|---|---|
| NTRM 1687 | 3/01/03 | ALM024630 | 1000. PPM | NITRIC OXIDE |

### INSTRUMENTATION

| INSTRUMENT/MODEL/SERIAL# | DATE LAST CALIBRATED | ANALYTICAL PRINCIPLE |
|---|---|---|
| BECKMAN/951/010177 | 12/14/00 | CHEMILUMINESCENCE |

### ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

**NITRIC OXIDE**

First Triad Analysis

| Date:12/06/00 | Response Unit:MV | |
|---|---|---|
| Z1=0.00000 | R1=100.0000 | T1=47.00000 |
| R2=100.0000 | Z2=0.00000 | T2=47.00000 |
| Z3=0.00000 | T3=47.00000 | R3=100.0000 |
| Avg. Concentration: | 472.1 | PPM |

Second Triad Analysis

| Date: 12/14/00 | Response Unit: MV | |
|---|---|---|
| Z1=0.00000 | R1=100.0000 | T1=47.00000 |
| R2=100.0000 | Z2=0.00000 | T2=47.10000 |
| Z3=0.00000 | T3=47.10000 | R3=100.0000 |
| Avg. Concentration: | 472.8 | PPM |

Calibration Curve

| Concentration=A+Bx+Cx2+Dx3+Ex4 | |
|---|---|
| r=.999992785 | 1687 |
| Constants: | A=1.220822425 |
| B=10.000976060 | C=0 |
| D=0 | E=0 |

APPROVED BY: